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ESSAY ON STALL FEEDING CATTLE. BY C. HILLYARD, ESQ., PRESIDENT OF THE NORTHAMPTONSHIRE FARMING AND GRAZING SOCIETY.

From the London Farmers' Magazine.

A prize of twenty sovereigns having been offered by the English Agricultural Society for the best account of stall feeding cattle, to be sent in before the 1st of March, the essay was sent in before the appointed day. At the latter end of April there was sent to the writer for circulation a list of all the prizes offered, which list contained the following conditions:—

Competitors for the Essay on Stall feeding must state:

1. The number and sort of cattle placed in the stalls.
2. Their estimated value.
3. The period of the year when put up.
4. Whether the cattle were tied up or not.
5. The times when the food was given; whether always given at the same hour each day.
6. The quantity of food given.
7. The price paid for what was bought, if any, and the estimated quantity and value of what was produced on the farm.
8. The price for which the cattle were sold, and the time when.

3, 4, 5, 6, answered.
1, 2, 7, 8, might have been very easily answered.

Under the conviction that no one has had more experience, or bestowed more attention to stall feeding, the writer of this is induced to become a candidate for the prize offered by the English Agricultural Society, for the best account of stall feeding cattle.

It is the writer's opinion that on all arable turnip land farms, beasts should be stall fed, in numbers according to the size of the farms; and also to have store beasts in the farm yards to eat straw, and the refuse hay, which the stall-feeding beasts will not eat; to trample the dung thrown out of the stalls and thus have all the straw produced on the farms turned into good manure.

Many occupiers of entirely grass farms, stall feed for six weeks before Christmas, the greater part of their best beasts; in thus doing they look chiefly to the increased value of their beasts; the dung being of little value to them compared to what it is to the occupiers of arable land.

The writer of this has for many years put into the stalls, the latter end of October, five and thirty bullocks, and as they have been taken out fat, has replaced them by others. Three men and a boy are necessary to attend this number of beasts. The boy and two men to cut the turnips with the machine, to feed &c., the other man to assist in throwing out the dung in the morning, and the remainder of the day in cutting clover hay into chaff; so that the weekly expense of attending beasts in the stall cannot be estimated at less than one shilling each: this, and the value of the food consumed, makes stall feeding very expensive. It is for the occupiers of arable land farms to consider whether being at such expense is likely to answer their purpose. Near large towns it cannot, for their straw can be exchanged for good dung. Buying manure and fetching it from a distance, the wear and tear is so great it cannot answer excepting where the produce of the farm is drawn to market. Those who with their arable have good grazing land, may turn their straw into good fair manure by giving their store beasts in the yard eating straw, three feeds daily of half a bushel of cut turnips; thus when they are turned out on good grazing land, they will become good meat the latter end of the summer or beginning of autumn, when good beef, from not being then plentiful, generally fetches a good price in Smithfield market.

In Norfolk it is a common practice to give store beasts in the fold-yard eating straw, as much linseed oil-cake as they will eat, this is getting good manure at an expense that cannot possibly answer but on very weak land at very low rents. It is a mistaken notion that beasts can be better fed in Norfolk than elsewhere. It is quite true that they are generally better fed, because it answers the purpose of Norfolk occupiers of land to keep them longer in the stalls.

Meat cannot be laid on lean beasts to pay the expences of stall feeding, allowing the utmost value of the dung produced; they should be half fat when put in the stalls: and the price of beef higher when they come out than when they were put in, to repay the great expenses of stall-feeding.

Beasts when first put up may, for a short time, be kept on common turnips and hay, to keep their bodies from being heated by the great change of the atmosphere of the field to that of the house; but common turnips, from having so great a portion of water in them, will do very little towards feeding.

For stall feeding on a large scale there ought to be a mill on the premises to grind the corn into flour, thus getting rid of the miller's toll, the trouble, inconvenience, and expense of sending to and from the mill, the stall feeder thus having meal, the produce of his own grain. There are hand-mills made to grind corn into flour, but the grinding being by stones, they require so many men to work them, that one worked by a horse would answer much better. The hand steel mills which are sold to grind corn into flour, will only break it. A one horse chaff cutter would be the most useful where there is much stall feeding, and in fact on every large farm.

In Norfolk the greater part of the beasts are fed in yards with sheds. Polled Scots, and their polled home-breds may do as well as if tied up, but horned beasts certainly do not.

Stall feeding answers better in Norfolk than in most other counties, the land in general being so weak as to require more manure to raise good crops of turnips and corn, rents therefore are generally lower than elsewhere, which enables the occupiers to be at a greater expense for manure, and thus to keep their beasts longer in the stalls, and make them very fine meat for the London

market in the spring, when so great a portion of the wealthy people of the country are in town, and can afford to pay the highest price for the best beef, which at that season of the year is Norfolk fed Scotch, which will travel the long distance to London, with less injury to their carcasses than any other kinds of beasts. Stall feeding beasts should have plenty of straw under them, the straw saturated with their urine and droppings, thrown out, and their beds shook up after each time of feeding; they will then soon lie down, and this tends to their making great progress in coming fat.

If beasts have much hair on their necks and chins, it should be cut off on their being tied up, as it is apt to become so matted together as to make them feel itchy and uncomfortable. Curry-combing and brushing does them good.

An ox house ought to have a manger with two divisions for each beast, and a water trough for every two; and over the manger a rack for hay. There should be windows convenient for throwing out the dung and letting in plenty of air on the beasts first going in; and afterwards so to close, that be the weather warm or cold, the house may be always kept in one equal and tolerably warm temperature.

Beasts should be pushed on by degrees to fatten, not so highly fed at first as to cloy their appetite. The system of feeding pursued by the writer for many years has been this,—for the first ten days or fortnight of tying up; three feeds daily, of half a bushel each of cut turnips, and as much hay, night morning and the middle of the day, as they will eat. The next fortnight the same feeds of turnips, with three feeds of cut hay, with a little less than a gallon of bean or barley meal in the whole; with a small quantity of fresh made linseed oil, just to flavor it; hay put into the rack after the first feed of turnips, and as much at night as they are likely to consume before morning.

When on full feeding it is thus;—first feed in the morning, half a bushel of cut turnips, directly afterwards half a bushel of cut hay, with about a pint and a half of meal in it. These feeds repeated at noon and in the afternoon, and supped up at night, with hay in the rack, and three oil cakes, of three pounds each, in the manger. If oil-cake is high priced and linseed not, it may be substituted for it, by being mixed with the cut hay and meal. Boiling it is best, because that best dissolves it, and also prevents the numerous seeds of weeds in it from vegetating; but it will do pretty well if steeped in boiling water; and so it will in cold if broken in a hand-mill, and using seven tubs, so that when given to the beasts it will have been steeped seven days, and thus become a complete jelly. When boiled or steeped in hot water, it becomes sour in a few days, in which state it cannot be so good for beasts, although they might not reject it.

The different weekly cost of the food consumed by each beast will be as follows, including the expenses of getting up, carting and cutting the turnips and hay, and also the expense of attending the beasts, taking into consideration the extra value of the manure.

Feed No. 1.	s.	d.
10½ bushels of Swede turnips -	2	9
1¾ cwt. of hay - - -	5	3
	8	0

Feed No. 2.	s.	d.
Turnips - - - - -	2	9
Hay, 1¼ cwt., cut and uncut -	3	9
Meal, 6 gallons, mixed with the cut hay - - - - - - -	3	0
Linseed oil, a pint - -	0	6
	10	0

Feed No. 3.		
Turnips - - - - -	2	9
Hay cut and uncut - -	3	3
Oil cake, 63 lbs., costing at home £11 a ton - - - - - -	6	0
Meal, 4 gallons - - -	2	0
	14	0

Finding at Christmas 1838 that I could not get English oil cake to cost me at home less than four pence the three pound cake, about £12 10s. per ton, I determined to feed the five-and-thirty beasts then in my stalls in the following way; and I never had beasts that cost so low a price, become better meat; at the same time acknowledging that the process of preparing the food was very troublesome, and therefore should not recommend this mode of feeding, without the master looked to it himself, or had men he could depend on.

Feed No. 4.	s.	d.
Three feeds daily of half a bushel of cut hay, which is five pounds, and four pounds of uncut at night, 1 cwt. a week - - - - - -	3	0
Boiled linseed, 2 lbs. daily, seven shillings per bushel - - -	2	0
Meal, barley, and bean mixed, 3½ gallons - - - - -	1	9
Potatoes boiled, 1½ gallons daily	1	6
Molasses, which is of a feeding nature, but given ¼ lb. daily, to make the mixture of cut hay, linseed, meal, and potatoes palatable - -	0	9
Turnips, ten bushels - -	2	5
	11	6

With a proper steaming apparatus, potatoes are a cheap and good food for stall-feeding.

Beasts may be fattened with little trouble and expense, with good feeding hay and raw potatoes; but not more than three pecks daily should be given, being of so heating a nature; if more is given, the beasts are likely to have all their hair come off, and to be greasy heeled.

Linseed oil cake is merely the husks of the seed after the oil is pressed out. Could my mixture of food in No. 4 feed be so pressed together as to form a cake, there cannot be a doubt but it would be as feeding. At the time the oil cake would have cost me eighteen pence per stone, this cost me, or I should say was of the value of one shilling.

Linseed without being mixed with other food would be of too relaxing a nature.

I tried sago, which, in the summer of 1838, was less than three half pence a pound, but it did not answer for stall feeding. It is well known to be good for weaned calves.

The comparative cost per stone of 14 lbs. for different kinds of food for stall feeding, is as follows:—

Linseed oil cake costing the consumer at home £10 per ton, 1s. 3d.; linseed at 56s. per qr., 1s. 11½ lb.; meal and barley, 30s. per qr., 1s.; bean

meal a stronger food, beans at 36s. per qr., 1s.; steamed or boiled potatoes on the average, about 4d. One stone of linseed in a mixture of feed will do as much towards fattening as two of cake.

The making out how the expenses of stall feeding are repaid, should be thus. The worth of each beast, on going into the stall should be entered into an account; at the bottom of which should be the value of all the different kinds of food consumed. Turnips, six or seven pounds an acre, about the value to be eat on the land by sheep; taking the turnips off may be said to be robbing the land of manure; but it is only borrowing from a part of the farm which is rich, to lay it on other parts where it is wanted. Hay at three pounds a ton is a full price being consumed on the farm.

To ascertain the profit of each beast must be in this manner. The averge cost of the keep for each beast will be for the first month, 9s. per week —the month £1 16s.; the cost for the next month, £2 2s.—for the last fortnight, £1 8s.; whole amount, £5 6s. Ten weeks is the time calculated for feeding, because beasts ought to be in that forward state when put into the stall, as not to require more time to come out fat.

An estimate of the gain or loss in the feeding, may be made out in this way. Beasts of a moderate size, if half fat when put into the stalls, will increase in the first month about 8 stone of 8lbs., in the next month about 10 stone; in the last fortnight, 6 stone. The whole increase of weight in ten weeks' stall feeding, 24 stone, which at 4s. 4d. a stone, amounts to £5 9s. When interest of money and risk is considered, this shows a poor account. But if the value of beasts when put into the stalls was estimated at 3s. 8d. a stone, and the worth of them when they came out was 4s. 4d. this would give a profit of £3 6s. 8d. on each beast of 100 stone. Often has the writer found no advance in price, and some years a decrease.

Although it may at times be doubted, if stall feeding proves to be a benefit to those who are engaged in it, it will always be beneficial to the public, by increasing the quantity of animal food for market. Landlords should encourage stall feeding, for it is a likely means of having their arable farms enriched; besides which it gives employment to laborers on their estates, at that time of the year when it is in many parishes difficult for them to obtain it. They should permit tenants to plough grass land that does not produce a good herbage, on condition that they stall-feed, and thus make a great quantity of manure. A profitable crop of oats the first year, and a crop of wheat the next year, may be obtained, a summer fallow the year after, if not turnip land, and with a crop of barley the year following, the proper seeds may be sown with it to bring the land which produced a bad herbage, into a good pasture.

After all the great trouble and expense of stall feeding, this mortifying circumstance has frequently occurred. Smithfield being overstocked, beasts have been sold there at less than they were worth in any other market; the butchers knowing that the beasts after their driving, and being so knocked about in the market, were so injured it could not answer to turn them out to come in the next market-day, therefore bought them at their own prices. This often serious loss to stall feeders and graziers, may in future be prevented if all the different large droves of fat beasts destined for the London market can be conveyed by rail-road at the same time, which appears doubtful. As the population of the country increases there must be an increased demand for beef; the increased supply must come from stall feeders, for there can be no increase of the acres of feeding land. Twenty years ago there were but few beasts but mine stall-fed in my neighborhood. Now there are many.

Stall feeding is generally supposed likely to answer best when the price of corn is low, but the old saying of "down corn, down horn" should be borne in mind. Such time may be the best to enrich the land, to produce large crops when corn fetches a better price.

In the feeding marked No. 2, good sweet grains may be mixed with the cut hay and meal. Turnips for beasts are best cut by the machines that do not cut them in thin slices, which takes more time in the cutting, and the beasts do not clear them up so well. The dirt is easily chopped off with the roots of the turnips as they are pulled up, so that washing is unnecessary.

A bushel of cut Swedes weighs 50lbs.; a bushel and a half is a fair daily allowance for a moderate sized beast, say from 100 to 122½ stones of 8lbs., which is 70 stones of 14 lbs., an acre producing 22⅓ tons will keep twelve beasts thus fed for eight weeks. Every beast in the stalls will make a large cart-load of manure in eight weeks.

To ascertain the progress beasts are making is by taking their girths once a fortnight. But until they have become marketably fat, the carcasses will not be the weight the measurement computes them to be. Beasts in the first fortnight increase but very little in their girth, because the first progress they make in feeding is in the side. When beasts are bought good fair meat, and driven 100 miles to get them home, their appearance and condition is sadly changed. They should lay in a well littered yard, a week or a fortnight, fed on turnips and hay, and, if it can be done, let out once a day into a field for water before they are put in the stalls. Beasts in the early stage of feeding are apt to be blown after eating their turnips. In most cases the swelling will subside if turned out of the stall and kept walking about some time. A table spoonful of carbonate of ammonia in a quart of water will relieve them, by correcting the acidity in the stomach, and expelling the wind.

No food can be given to stall-feeding beasts that will fatten them so soon as linseed oil-cake; but without it is at a low price there is no money expended on a farm that brings back so poor a return for the expenditure, but there is much less trouble in feeding with it than in any other way; beasts that have been fed with it do not, after a long drift to market, lose their firmness of handling, as those do fed without either cake or linseed.

The superiority of the manure produced from oil cake or linseed fed beasts ought to be considered. Those who have good feeding hay can fatten the largest sized beasts with it and oil-cake.

Durhams and Herefords are the most likely to pay the best for stall-feeding. When Durhams can be obtained that are well bred, I prefer them, for although they consume more food they increase so much more in weight as to produce the most profit.

There is the same trouble and expense in attending small beasts and sending them to market as with large. The writer recommends when buy-

ers come to bargain for stall feeding beasts that they are returned out of the stall, where they appear smaller than they really are.

He also recommends stall-feeders to get from Carey's, in the Strand, the sliding scale formed by the late Dr. Woolaston, from my book, given to Lord Althrop, to compute by measurement the weight of the carcass of fat cattle.

PENS FOR SWINE. MANURE.

From the American Swine Breeder.

The allotment of suitable enclosures, and the construction of convenient pens for swine, are matters of great importance to those who rear these animals with a view to profit. The miserable custom of permitting swine to roam at large, unattended by a swineherd, and allowing them to gather food throughout extensive districts, cannot be too severely reprehended. It is desirable that every farmer who consults the comfort of his animals should have both pens and pastures—the latter well covered with clover, of small dimensions, and, if possible, affording the hogs ready access to water. To effect this object, the fences which enclose the pasture may be extended so as to embrace a portion of some running stream, or if this is not practicable, some spring, from which water may be constantly flowing into an artificial reservoir. It is found that hogs thrive better, when they enjoy the means of slaking thirst as nature prompts them, than when they are restricted to water drawn from wells and furnished at stated intervals. Even in the absence of a stream suitable for the purpose, or a spring, water should, if possible, be conveyed to some artificial pool, or trough, in sufficient quantities for their use at any moment. The size of the pasture will of course depend, to some extent, on the situation of the farm, and number of hogs. In general, however, where the herd is numerous, it is deemed advisable, to scatter it in different enclosures, placing those hogs that are nearly of the same age and strength together. Small orchards, well set in clover, afford an excellent pasture for hogs. Their manure greatly enriches the ground; while the roots of the trees, near which, in such enclosures, their rooting propensities are mostly exercised, derive great advantage from frequently loosening of the soil.

It is a matter of great importance to the farmer to provide such enclosure, and adopt such treatment, as will secure from his hogs the greatest quantity of manure. Hog manure is extremely valuable, and large quantities may be obtained with slight attention. Where these animals are allowed the range of small yards or pastures, the method pursued by a correspondent of the Farmer's Cabinet, will prove advantageous* :—"I usually keep and fatten, he remarks, four hogs in the year; these I keep confined in a yard twenty feet square, with a warm and convenient shed attached thereto, as a shelter for them during the night time, and in cold and stormy weather." Into the yard he placed the scrapings of ditches, the dirt that is continually in and about buildings, and this became mixed with the straw with which they were littered. The whole was cleared out as often as was judged expedient. The quantity and quality of the manure would be greatly increased, if the pen was supplied with weeds, (an excellent way this of turning these noxious plants to a good account,) and in the absence of weeds, which by the way is not very common, even on our best cultivated farms, resort may be had to the woods; here the farmer has an abundance of leaves and other rubbish that may be used to great advantage. "By the adoption of the above course, more than twenty-five loads of manure was obtained, as the product of four hogs, and this, too, of a superior quality to that generally derived from the stable or yard."

Another writer in the Yankee Farmer,* says:—"My plan is this; yard the hogs through the year. Give each hog, to work upon, ten loads of manure from the swamp. Some men think to avoid expense in keeping, by permitting their hogs to 'run at large,' or in a large pasture. This is a bad practice; the hogs 'run away' so much of their flesh, that it requires nearly as much to keep them in a thriving state as if they were yarded. If it did not, the pasture would be much more preferable for other stock. More than this, the hogs will convert about four loads more of mud into good manure, which will more than twice pay the extra cost of yarding."

Another correspondent still, of the same paper, remarks†:—"I keep my sty well littered with straw, leaves, weeds, soil from the woods, and meadow earth, obtained from ditching, by carting, together with that put into the yard, from two to ten loads per week. I sometimes put a few handfuls of rye in different places in the yard, and let in the hogs. Feeding them there for a few days, they completely stir up and commute the contents of the yard. I am confident that I make four times the quantity of manure my father did, and with no increase in the number of stock, and of a little better quality, too, comparatively none of its strength being washed away by the rains and evaporated by the sun."

The suggestions of a correspondent to the Northern Farmer, quoted in the Farmers' Register, contain much information on this subject. After stating the reasons which induced him to abandon the ordinary mode of suffering his pigs to run at large, for the better one of confining them in pastures—and his subsequent exchange of this for a smaller enclosure, which he contracted from time to time, until satisfied that a yard of twenty feet by fourteen, was sufficient for six hogs, if well supplied with materials to make manure in to advantage, he thus continues:—"My method of supplying these materials is the following; after having cleared their yard at the season of planting, I put into it such portions of straw as I may have on hand after the season of foddering is past; and if I have not a sufficient quantity of this to furnish the necessary supply till vegetable substances attain a sufficient growth to be profitably collected, I put in earth collected from the low places by the side of the highway; though this I more generally place in or near my barn yard, in a situation to receive and retain the wash

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* Vol. ii. p. 43.

* Vol. iii. p. 410.
† Vol. i. p. 67.

that might otherwise escape from that. Brakes and weeds of any kind are valuable. These I make use of, to the extent they are attainable, when in a green state, as I consider green vegetable substances, for this purpose, far more valuable than dry. Potato tops, when pulled for early use, before they become dry and shriveled, I consider equal if not superior to any other green substance for this purpose. Pea vines I usually put into my hog yard after the peas are thrashed off, and if some are put in before being thrashed, they are as gratefully received by the inmates of the yard. The quantity of manure made by my hogs is, for each one, double that made by each cow for the same period of time. The quantity of vegetable matter suitable for manure, that remains in most crops after the fruit and grain are selected, and the amount of manure that can be obtained if this matter is carefully collected and carted to the pens of hogs and other animals are indeed astonishing. "The expressed cane," says J. H. Cowper, in an able communication to the Southern Agriculturist, "tops and leaves, from an acre of cane yield about 10,000 lbs. of dry vegetable matter. An acre of corn including blades, stalks, husks, and cobs, gives about 3500 lbs., when the yield of corn has been 20 bushels; and the after crop of peas 1000 lbs.—together 4500 lbs. An acre of solid peas 2000 lbs. The potato vines, pumpkins, and turnips, being eaten green, contribute only to the production of fluid manure. The total quantity of vegetable matter to be applied to the manuring of 16 acres in crop, will therefore be—

4 acres in corn, at 4500 lbs. per acre, -	18,000 lbs.
1 acre in peas and turnips, - -	2,000 "
3 acres in cane, - - - -	30,000 "
	50,000

which, if merely rotted by the rain, will yield 100,000 lbs. of manure, and if rotted by urine and dung of stock from 150,000 to 200,000 lbs. or at least 25,000 lbs. of manure to each of the four acres proposed to be manured."

We are inclined to dwell still longer on the subject of manure, because its great importance, and the proper modes of collecting the greatest quantity, seem in many portions of our country to be wholly overlooked. Especially is this the case throughout the western states. Trusting to the extreme luxuriance of the soil, the lands of many farmers are burdened with one exhausting crop after another, until at length the productiveness of the farm is materially reduced, and finally measures are necessarily resorted to, to improve an impoverished condition of the soil which proper manuring would have prevented altogether. Many persons seem to consider a yard where the dung of animals can be collected, sufficient for all purposes—little dreaming that upon the construction of this enclosure depends both the quality and quantity of the manure; that successive rains may be gradually washing away the most fertilizing portions of their yard, or excessive fermentation causing the escape of gases which, if possible, should always be retained. The dung of animals, when intended for manure, should be protected as far as practicable from exposure to the air. "He," says Arthur Young, Esq., "who is within the sphere of the scent of his dunghill, smells that which his crop would have eaten, had he permitted it. Instead of manuring the land, he manures the atmosphere, and before his dunghill is finished, another parish and perhaps another county." "As few exhalations," remarks Fessenden,* "as possible, ought to be suffered to rise from the excrements of animals. Fresh manure ought to be kept as carefully from the sun and rain, as grass which has been cut for hay." But how are these objects to be effected? The answer is an easy one. Prevent the rain from draining off the best portions of the manure, by constructing a yard in a dishy form, lowest in the centre, so that the urine of the animals may be collected in a reservoir and retained; and prevent fermentation, or absorb its products by occasionally scattering over the dungheap a quantity of the same earth with which the yard is bedded. "Earth," remarks the author of the letters of Agricola, "is a powerful absorber of all the gases which arise from putrefaction." Put a layer of common soil along the top of a fermenting dunghill, from twelve to eighteen inches thick, and allow it to remain there while the process is carrying on with activity, and afterwards separate it carefully from the heap, and it will have been impregnated with the most fertilizing virtues. The composts which of late have attracted such universal attention, and occupied so large a place in all agricultural publications, originated in the discovery of the absorbing power of the earth, and in the application of it to the most beneficial purposes. A skilful agriculturist would no more think of allowing a violent fermentation to be going on in his dunghill, unmixed with earth, or other matter, to fix and secure the gaseous elements, than the distiller would suffer his apparatus to be set at work, without surmounting his still with the worm, to cool and condense the rarefied spirit which ascends to evaporation. In both, the most precious matter is that which assumes the aeriform state; and to behold it escaping with unconcerned indifference is a demonstration of the most profound ignorance.

A slight fermentation in a dunghill, may indeed be advantageous in causing the woody fibre, contained in many of the substances deposited there, to decay and dissolve, but wooden fibre is the only vegetable matter that requires this process to render it nutritive to plants. In the straw of chaff and litter, as well as the leaves and other products of the forest—which may be advantageously placed in barn yards for conversion to manure—will be found considerable portions of fibrous matter, which must be fermented to be useful. It therefore becomes a matter of great importance to ascertain correctly how far this process of fermentation should be allowed to proceed. On this point Sir Humphry Davy remarks†:—"In all cases where dung is fermenting, there are simple tests by which the rapidity of the process, and consequently the injury done may be discovered. If a thermometer, plunged into the dung, does not rise to above 100 degrees Fahrenheit, there is little danger of much aeriform matter flying off.

"When a piece of paper, moistened in muriatic acid held over the steam arising from the dung-

* Vide Complete Farmer, p. 173.

† Vide Davy's Agricultural Chemistry, republished in the Farmers' Register.

hill, gives dense fumes, it is a certain test that the decomposition is going too far, for this indicates that volatile alkali is disengaged.

"When dung is to be preserved for any time, the situation in which it is kept is of importance. It should, if possible, be defended from the sun. To preserve it under sheds would be of great use; or to make the site of a dunghill on the north side of a wall. The floor on which the dung is heaped should, if possible, be paved with flat stones, and there should be a little inclination from each side towards the centre, in which there should be drains, connected with a small well furnished with a pump, by which any fluid matter may be collected for the use of the land. It too often happens that a dense mucilaginous and extractive fluid is suffered to drain away from the dunghill so as to be entirely lost to the farmer."

The urine of animals is one of the most valuable manures that can be applied to land; but it should be applied in a recent state, as a great portion of the soluble animal matter it contains is destroyed during the process of putrefaction. If unmixed with solid matter, it should always be diluted with water, as in its pure state it contains more animal matter than can be safely absorbed for the nourishment of plants.

According to some writers and practical farmers,* the value of the urine of cattle, if properly preserved and applied to the purposes of vegetation, is greater than that of all the dung which the same animals would yield. A letter from Charles Alexander, near Peebles, in Scotland, addressed to Sir John Sinclair, in 1812, contains much valuable information on this subject. "This intelligent farmer had long been impressed with the great importance of the urine of cattle as a manure, and he set about to discover, by a long and well-conducted series of experiments, the best method of collecting and applying it. He began by digging a pit contiguous to the feeding stable, but distinct altogether from that which was appropriated for the reception of the dung. The dimensions of this pit were thirty-six feet square, and four feet deep, surrounded on all sides by a wall, and the solid contents were one hundred and ninety-two yards. Having selected the nearest spot where he could find loamy earth—and this he always took from the surface of some field under cultivation—he proceeded to fill it, and found that, with three men and ten horses, he could easily accomplish twenty-eight cubic yards a day; and the whole expense of transporting the earth did not exceed twenty-two dollars. When the work was complete, he leveled the surface of the heap in a line with the sewer which conducted the urine from the interior of the building, on purpose that it might be distributed with regularity, and might saturate the whole from top to bottom. The quantity conveyed to it, he estimated at about eight hundred gallons. The urine was supplied by fourteen cattle, kept there for five months on fodder and turnips. The contents of the pit produced two hundred and eighty-eight loads, allowing two cubic yards to be taken out in three carts; and he spread forty of these on each acre, so that this urine in five months produced a compost sufficient for the fertilization of seven acres of land. He states farther, that he had tried this experiment for ten years, and had used indiscriminately in the same field either the rotted cow-dung or the saturated earth; and in all stages of the crop he had never been able to find any preceptible difference. But what is still more wonderful, he found his compost lasted in its effects as many years as his best manures; and he therefore boldly avers that a load of each is of equivalent value. Mr. Robert Smith, of Baltimore, has his stables constructed in such a manner that all the liquid discharges of his cattle are conducted, together with the wash of the barn-yard, into a cistern, pumped into a hogshead, and applied in a liquid state to the soil which it is wished to manure. This mode of making use of this substance, is likewise recommended in the Code of Agriculture:—"The advantages of irrigating grass lands with cow urine almost exceed belief. Mr. Harley, of Glasgow, (who keeps a large dairy in that town,) by using cow urine, cuts some small fields of grass six times, and the average of each cutting is fifteen inches in length. There are disadvantages, however, connected with this mode of applying this powerful manure. It must be applied soon after it is formed, or oftentimes the putrefactive process will commence and deprive it of part of its efficacy. And, as urine is of a scorching quality, it is unsafe to apply it to growing crops in great heat or drought. Hence it is unadvisable to use it except for grass, after the months of April and May, unless diluted. It is particularly useful in the spring, when the application of liquid manure gives a new impetus to the plant and makes its growth more vigorous. This manure forces newly planted cabbages in a most remarkable manner."

* Vide Complete Farmer, p. 175—177.

BEET SUGAR IN EUROPE.

As a source of wealth, profit, and general benefit to the agricultural interests of the country the cultivation of the sugar-beet, either for the purpose of making sugar, or feeding stock, is most unquestionably entitled to the attention of every agriculturist and philanthropist in the country.

When in the sugar districts of France, a few years since, the writer became so much interested in this subject, that he has ever since watched its progress, not only in that country, but throughout Europe, with increasing interest, and with the hope of seeing it, long ere this, introduced into this country. At the time of his visit to France, four or five per cent. was the maximum yield of sugar from the beet, and with this yield, it was considered an excellent business. Since that time, so much improvement has been made in its manufacture, that 7 or 8 per cent, is now readily obtained, and in some cases as high as nine. The writer has lately been shown a letter from M. Crespel of Arras, one of the largest manufacturers in France, which states that at *one* of his establishments, (and he is interested in eight or nine,) he will make 1000 hogsheads of sugar the present season, and this at a cost of less than 5 cents per pound.

David Lee Child, Esq. who has spent eighteen months among the sugar manufactories in France, Belgium and Germany, in a work on this subject which he has recently published in Boston, estimates the quantity of beet-sugar manufactured in

Europe in 1838, at 150,000,000 of lbs.; and it is confidently expected that the crop of 1839 will reach 200,000,000 of lbs., or two hundred thousand hhds. which is nearly four times the average crop of Louisiana. Indeed, the manufacture of sugar from the beet has not for a long time been considered a matter of speculation or experiment in Europe, but a subject of very sure and profitable investment of capital. The manufacture of sugar from the beet however, is but a *small portion* of the advantage arising from its culture. As winter food for stock, particularly milch cows, it is unquestionably the *most profitable* crop the farmer can raise; and its meliorating effects upon the soil, and the increased quantity of manure, wherever the beet has been cultivated in Europe, have, it is well known, more than doubled the produce of the soil, and in many cases, more than trebled the price of the lands.—*Jour. Com.*

TREATMENT AND FOOD OF YOUNG PIGS.

From the American Swine Breeder.

In the second chapter of this work, we have already alluded to this subject,—and it is certainly one deserving the most careful consideration,—care and attention to these animals at this tender age is of far greater importance than the practice of many would lead us to suppose and upon their treatment during the few first weeks depends the ease and rapidity with which they can be subsequently reared and fattened. To wean young pigs in such a manner, that they may lose no flesh during the process, and may remain at its close in a healthy and growing condition is an undertaking attended with considerable difficulty. Their food should in general be given *moderately warm*, and milk is undoubtedly one of the best articles which can be offered at this period. The produce of the dairy should, therefore, be used frequently and freely. Many judicious farmers have asserted, as the result of experience on this subject, that cows may be kept, for the exclusive nourishment of *young pigs*, with great economy. That this will be the case, when the proceeds of the dairy are given, no one who has tried it will dispute. Several instances are recorded of hogs that have been *fattened entirely* on this article for the purpose of experiment; and the result has shown, that no pork is superior in point of weight and substance. Of the astonishing rapidity with which animals will thrive and increase while using it, we have ourselves seen abundant proof, in the growth of an improved Berkshire boar, which was weaned under the direction of a highly intelligent agriculturist, Solomon Porter, Esq., of Connecticut, and afterwards fed almost entirely on this article, and which attained, at the age of three months, the great weight of one *hundred and forty pounds.*

The practice of mixing milk with other articles for food of young pigs, is highly recommended by many farmers. Says a judicious breeder, in a letter to the Hon H. L. Ellsworth, "From actual experience, I have come to the conclusion, and practised upon it for the last twelve or fourteen years, of having as many spring pigs (that come say in March) as I have cows for the summer, and feeding the pigs on milk or whey, mixed with provender, ground from corn, rye, oats, barley, or buckwheat, and prepared in the form of a pudding, in which way the pigs will eat it best. If they appear to be clogged with one kind of grain, I try another, and often mix different kinds together."

The author of the 'Practical Elements of Agriculture,' suggests that pigs should be weaned at the end of the first six or eight weeks; and be fed three times daily with wheat bran, barley dust, or by farinaceous food mixed with water warmed to the temperature of the mother milk, and with whey, or other refuse of the dairy or kitchen. Young pigs, he remarks, are sometimes disposed of when sucking the dam. In other cases, they are sold when weaned, to persons who design to feed them, and in other cases they are fed by the breeder himself.

"When they are fattened by the breeder, two modes of feeding may be adopted. They may either be suffered to go at large, or they may be kept in pens and houses; by the first of these methods after being weaned and fed for a period until they are able to shift for themselves, they are turned abroad to pick up what they can in the straw yard, a little green food, as tares or clover during summer, and turnips or potatoes during the winter being supplied to them. They do not, under this management, receive any more expensive feeding until they are put up finally to be fattened, when they are confined for a few weeks and fed on farinaceous and other food. The pigs intended for this species of management should be the best of the *smaller varieties*, and they may be killed for domestic use or disposed of when seven or eight stones weight. All the accommodation required under this system of management, is a few pens with sheds: first, for the breeding swine when nursing their young, and second, for the pigs which are in the course of being fattened.

In all cases upon a farm, a certain number of pigs may be kept at large in this manner, for picking up the waste of the farm yards. But the regular course of management and that best adapted, where the feeding of the animals is carried on upon a large scale is where separate feeding-houses for the pigs in which a greater or lesser number can be kept.*

"Weanlings," remarks Mowbray, "should have at least one month of delicate feeding, warm lodging, and care. The same kind of food should be continued to them three times a day, to which they were at first accustomed with the sow. The *first* food should consist of warm and nourishing wash, whether from the kitchen or dairy, thickened with fine pollard or barley meal. A portion of strong beer may be added as a cordial, should circumstances render it necessary. The common wash, pollard or meal mixed with water, if scalded the better. The same diet is proper for the pigs to partake of whilst sucking. Very young pigs ought not to be left abroad in continual rains, and will always pay for a daily moderate feed of old beans with clover."

"Weanlings are fattened for delicate pork *chiefly in the dairies*, where they are made ripe in a few weeks. Generally a pig of five or six months old will be fattened in seven, or eight, or twelve weeks, dependent on his condition."

An English writer remarks, "Swine will fatten much faster on *warm* than cold food. Corn and cold water will make them healthy, but warm be-

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* Vide Elements of Practical Agriculture, p. 601.

verage is considered as requisite to quick growth. Some English farmers turn in their little pigs to the fatting sty. While the fatting hogs are taking their repast the little ones wait behind them, and as soon as their betters are served, lick out the trough."

"Besides the advantage of having by this method no waste or foul troughs, there is another: the large pigs rise alertly to their work lest the small ones should forestall them, and fill themselves the fuller, knowing they have it not again to go to.

"The disadvantage of this practice is that the large ones are apt to lord it too much over the little ones, especially in a confined sty. If, however, they have a separate apartment assigned them, with an entrance too small for the fatting swine to follow them, this disadvantage would be in a great measure remedied."

A writer in Rees's Encyclopedia, while writing in regard to *young pigs* and *sows with pig*, holds the following language: "The sows considerably advanced in pig, and those with pig, should be fed in a better manner than the store pigs. The former should be supplied with good wash twice or ofiener in the day, and have a sufficient allowance of cabbages, potatoes, carrots, or other similar vegetables, so as to keep them in good condition, which is shown by the gloss of their coats. The sows with pig, should be kept with the litter in separate sties, and be still better fed than those in pig. When dairying is practised, the wash of that kind which has been preserved for the purpose while the dairying was at its height, in brick cisterns constructed for receiving from the dairy—must be given them, with food of the root kind, such as carrots, parsnips, potatoes, and cabbages, in as large proportions as they will consume them, in order that the pigs may be properly supported and kept in condition.

But when the business of dairying is not carried on, so as to provide wash of that sort, meal of some kind or other must, Mr. Arthur Young thinks, be had recourse to for the making of wash, by mixing it with water which, in the summer season, will be sufficient for their support, and in winter it must be blended with the different sorts of roots prepared by boiling; or when for young pigs with oats and pea-soup. With this soup and dairy-wash, when proper attention is bestowed, young pigs may, he conceives, be weaned and reared in the winter season even, with profit and success. The pea soup is an admirable article when given in this intention. It is prepared by boiling six pecks of peas in about sixty gallons of water, till they are well broken down and diffused in the fluid; it is then put into a tub or cistern for use.

When dry food is given in combination with this, or of itself, he advises oats, as being much better than any sort of grain for young pigs, barley not answering nearly so well in this application. Oats coarsely ground have been found very useful for young hogs, both in the form of wash with water, and when made of a somewhat thicker consistence. But in cases where the sows and pigs can be supported with dairy wash and roots, as above, there will be a considerable saving made by avoiding the use of the expensive articles of barley meal, peas or bran, and pollard.

Mr. Donaldson remarks that in the usual mode the pigs reared by the farmer are fed for some weeks, after they are weaned, on whey or butter milk or on bran or barley meal mixed with water. They are afterwards maintained on other food as potatoes, carrots, the refuse of the garden, kitchen scullery, &c., together with such additions as they can pick up in the farm yard. Sometimes they are sent into the fields at the close of harvest, where they make a comfortable living for several weeks on the gleanings of the crops; or at other times where the farms are situated in the neighborhood of woods or forests they are sent thither to pick up the beach mast or acorns in the fall of the year. And that when they are arrived at a proper age for fattening, they are either put into this fitted up for the purpose, or sold to distillers, starchmakers, dairymen, or cottagers. As to the treatment and feeding of *porkers* or *growing stores*, considerable diversity of sentiment prevails; some contending that they should be constantly confined in suitable pens or small enclosures, while others recommend their ranging more at large—where the object desired is merely to keep these animals in a thriving condition till the season of fattening arrives; the latter method may be pursued perhaps with some advantages. Still in these cases, the range allowed should not be too extensive, and generally confined to yards in the immediate vicinity of the barn, or at the proper season to pastures well set in clover.

A STATEMENT OF THE CULTURE AND PRODUCT OF SUGAR BEET, MANGEL WURTZEL, FIELD CARROT AND SUGAR PARSNIP ON THE FARM OF JAMES GOWEN, MOUNT AIRY, IN THE SEASON OF 1839.

Submitted and read by James Gowen, before the "Philadelphia Society for promoting Agriculture," at their stated meeting, Wednesday, Feb 5th.

The land set apart for these roots was part of an old apple orchard, and is a light sandy soil, intermixed with mica, or isinglass, and from which a crop of corn had been taken the previous year. It was ploughed as early in the spring as possible, say 19th March, and before ploughing was limed at the rate of thirty bushels to the acre. It was permitted to rest a few weeks, after which it had a tolorable dressing of well rotted stable manure immediately ploughed in. Before harrowing, it was treated with a few cart loads, say about 150 bushels, good street dirt, applied lime fashion from the cart, by scattering with the shovel—then harrowed. The quantity of manure in all was not more than would have been used on similar soil in same condition for potatoes. The labor up to sowing was two ploughings, two harrowings and one rolling, the last operation deemed indispensable in such soil, and to render the drilling more perfect.

Half an acre was intended for mangel wurtzel—half an acre for sugar beet—half an acre for field carrots, and a quarter of an acre for sugar parsnip; but the seed for mangel wurtzel falling short, and there being an abundance of beet seed on hand, the latter was increased to more than half an acre, while the former stood less by as much as the other was increased.

The drill used when working for beet and mangel wurtzel was provided with three teeth, set two feet six inches apart, cutting three drills of two

and a half feet apart at one operation. For carrot and parsnip four teeth were furnished, set two feet apart, cutting four drills, two feet asunder, at one operation. Seed sown continuously in the drill by hand, in quantity for all about three times as much as plants would be required. All was sown betwixt the 16th and 18th of April. When well up and properly developed, the beet and mangel wurtzel were thinned to six or seven inches apart, the carrots to three or four, and the parsnips to four or five inches apart.

The hoeing was performed by a cultivator set with duck feet or scalpers; it might be dragged by a stout man, but in the present case a light short-tread horse was used, led by a careful man while a thorough hand held or conducted the scalper. The holder, or ploughman, should be of quick eye and steady hand, to be prepared for the slightest deviation of the horse which might bring the outline scalpers next the drill, to which the inclination tended, upon the plants, which would prove as fatal to them as to the weeds—the scalpers making clean work of all that come in their way. By this method of hoeing, and of keeping the ground clean and loose, much labor and time were saved, for in two hours as much might be done in this way, as would take a good hand to perform in a week, and then it would be better done by the scalper, than by hand hoeing. An hour or two by the scalper at proper and convenient periods, with now and then a ready hand weeding when coarse weeds were observable among the plants were all the time and labor bestowed at this important stage of culture. Taking the whole labor from the beginning to the gathering of the roots included, it would not be greater than that which is usually bestowed on a well worked patch of corn; nor can the manure used, be estimated, as to quantity and value, to be greater than would be required for potatoes cultivated in the common and usual way on a patch of ground in similar condition.

Product.

	Tons.	*cwt.*	*qrs.*	*lbs.*
Sugar beet, less than three-fourths of an acre, having in the patch ten large old apple trees, produced 640 bushels clean and close topped roots; a bushel (as ordinarily filled in manner as the 640) weighed 64 lbs. - - - - - - - - -	18	5	2	24
Mangel wurtzel, less than three-eighths of an acre, having six apple trees in the patch, 320 bushels.	9	2	3	12
Field carrot, half an acre, having nine apple trees in the patch, 260 bushels,	7	8	2	8
Sugar parsnip, one-fourth of an acre, having seven apple trees in the patch, 120 bushels	3	8	2	8
Total	38	5	2	24

In less than two acres.—Would not be over one and three-fourths of an acre, deducting space of trees. If allowance be made for trees and their shade, the above result must prove very encouraging to those who intend to turn their attention to the culture of green crops.

DEPTH OF PLOUGHING.

From the Library of Useful Knowledge.

The proper depth of ploughing must necessarily depend upon the nature of the soils; but although every intelligent husbandman must be aware of the superiority of those of a deep staple over those which are shallow, yet, in discussing the propriety of the extent to which the operation may be safely carried, it should be borne in mind that there is a wide difference between the effects of ploughing deeply into land, the vegetative stratum of which is of nearly equal fertility throughout, and that of augmenting a shallow surface of fertile soil by mixing it up with a subsoil of inferior quality.

The depth to which the roots of plants penetrate into the earth in search of sustenance, varies as much, according to the properties of the soil, as does the nature of the plants themselves. There are many, the roots of which are found at fifteen to twenty, and even thirty feet under ground—sainfoin and lucerne, for instance; even red clover will strike down to nearly three feet, if the soil be a fertile loam; and some of our commonest vegetables, if it be friable or sandy, push their tap-roots to about the same depth. But as the land is chiefly destined for the production of grain, its value is rather to be considered according to its capability for the growth of corn than for that of any particular species of green crop.

It may be observed by the mere naked eye, that if the land be of a free nature, the roots of wheat will penetrate as far as eight inches into the earth; and when sown on the crowns of ridges, they have been found in rich soils at the depth of twelve; though that probably arose from the greater influence of the atmosphere, for they do not reach to the same depth on level ground. The seed is usually sown at about two inches deep; consequently, the roots may be ten inches long. We may, therefore, assume the depth of twelve inches as the utmost vegetative limit of corn land.

If the plants lie close together, they are disposed to penetrate more deeply into the earth than when they are wide apart; for it may be remarked that the roots of corn avoid each other, and push their strongest shoots into those spots where they have most room to spread; but if the seed be thickly sown, they are then forced to strike their roots perpendicularly, instead of laterally, into the ground. Still, however, this must depend upon the nature of the land; for if the subsoil be sterile or tenacious, the roots then either meeting opposition, or not finding nourishment, must again seek the upper stratum. There, they become matted together, and, each contending for the share of nutriment of which it has been deprived, the weakest are often seen to perish; which in a great measure accounts for that partial failure which frequently attends corn crops at the very height of the season. Provided the soil be open and tolerably fertile, the nearer its depth approaches to that which we have stated to be its vegetative limit, the great number of plants may it therefore be supposed capable of furnishing with support;* and, if attentively observed, a material difference will be found between

* A remarkable instance of this is mentioned in the Bedford Report, in which it is stated "that a road having been made across the ends of some ridged lands in the parish of Ridgemount, the cultivated soil of the ridges was cast into the hollows. The field was afterwards sown with barley, and the scattered corns which grew where the soil was accumulated in the ancient furrows formed a remarkable contrast with the rest of the field. The produce of the barley crop was little more than three quarters per-acre, while that which grew on the same poor soil, accumulated, perhaps, a foot deep, was remarkably luxuriant, many of the corns producing from ten to twenty stalks, and the ears large in proportion." An effect which the reporter ascribes to no other cause than *the depth of the soil*.—p. 277.

the nutritive properties of land of a deep staple, and that which is more shallow, although the quality of both, when tried in equal quantities, may be the same.* When deep, it also possesses the great advantage of suffering less either by extreme heat or by wet, than when thin; and the corn being supported by a greater depth of root, which probably affords proportionate strength to the lower part of the stem, maintains its freshness with greater vigor in times of drought, and is less subject to be laid by storms of wind or rain. It is almost unnecessary to add, that depth of soil is equally advantageous to every crop, the roots of which go deeper into the soil than those of corn, though its progressive increase in value is not so great as that which lies nearer to the surface.

In order to maintain the properties of a deep soil in a perfect state, it is, however, expedient to plough it from time to time to the full depth of the vegetative stratum; so that, being completely worked by frequent turnings, it may be freely exposed to the influence of the atmosphere. If that be not done, or only superficially performed, the ground will, by slow degrees, become gradually impoverished; for, besides being deprived of the benefit of exposure to the air, a crust of hard and almost impenetrable matter will, in some soils, be formed immediately below that portion upon which the plough was usually made to act, thus constituting a barrier between the upper surface and the subsoil, which is well known to farmers under the appellation of the *moor-band*, or *pan*. It is not, however, necessary to repeat the operation, even on heavy land, more than, perhaps, once in six or seven years, especially if the intermediate ploughings under the common course of cultivation be made at various depths; for nothing tends more to the formation of the pan than the constant repetition of the process at the same depth. Thus it will not escape observation, that one great advantage of the alternate system of husbandry arises from the distinct nature of the different roots which are cultivated, and the consequent necessity of ploughing at various depths, so as to afford them room to seek for sustenance. On tenacious clays, which, being confined to the growth of grain, are usually ploughed to the same depth, it also forms a strong reason for the adoption of the summer fallow.

The maintenance of the properties of the soil *in its original state* is, however, a very different mode of procedure from that required by an endeavor to *restore it to perfection;* for there is much land of a deep and naturally mellow staple, the lower strata of which have been rendered sterile by shallow ploughing, and can only be progressively renovated by gradual degrees; or, according to the practice of those farmers who "like to go deep enough to chip up the dead soil, now and then, and show it a little upon the surface after all is finished."* Many instances have, indeed, been recorded in which the subsoil, when brought to the surface and exposed for some time, has proved extremely fertile; but in all those cases, the earth, when chemically analyzed, has been found to contain a considerable portion of carbon, and unless afterwards sustained by proportionate quantities of manure, its good qualities have been speedily exhausted. It cannot, therefore, be deemed generally expedient to bring up a greater quantity than at the most two inches of the virgin earth, even supposing it to be naturally of the best average quality. The operation should be performed before the winter, and the soil should be incorporated by the means of a summer fallow; observing however, that its main object being to expose this fresh substance to the atmosphere, it should be left as long as possible on the surface. The manure should be also applied at the same time, and, instead of being mixed up with the soil, should be spread uniformly over this layer of new earth, which thus imbibes its juices during the whole of the wet season, and, notwithstanding all the objections which have been urged against the evaporation of dung,† never fails to produce a striking effect on its amelioration. In this manner, Mr. Thaër assures us that he has successively, during a series of years, effected the gradual and complete mixture of different layers of soil in one season; that he has thereby not only augmented the vegetative stratum of his soil, but has experienced a very sensible improvement in his crops; and that, after the close of a rotation, he has repeated the experiment with equal success. To which we may add, that many farmers who have followed the same plan, have uniformly found it attended with similar results; though others, who have not taken the precaution of going leisurely to work, or who have not been sufficiently aware of the nature of the subsoil, have, in some instances, done considerable injury to their land.‡

There are, no doubt, many *deep soils* naturally of an equal quality throughout, but which, consisting of tenacious clay, or *till*,‖ of various kinds, would, if brought up to the surface, impoverish the

* Von Thaër calculates this difference in proportionate degrees in land which contains a vegetative stratum of soil of four, six, eight, and twelve inches in depth; provided, of course, that it be all of equal quality. If, therefore, each seed were to produce a plant, it would follow that ground which contains eight inches depth of fertile mould, might be sown with double the quantity of that which consists of only four inches. He, however, admits that this principle cannot be carried to that extent, because the action of the atmosphere must ever afford such a superiority to the surface, that a cubic foot of mould, if divided into two square feet, will always produce a greater number of plants than if the seed were sown upon one foot superficial; but he assumes the value of the land to be increased in the proportion of 8 per cent. for every inch of mould beyond the depth of six to ten inches, and to be diminished in the same proportion, from six to three inches in soils of a thinner staple.—*Principes Raisonnés d'Agriculture*, vol. iii., p. 138. s. 735.

* Survey of Essex, vol. i., p. 198.

†On the subject of evaporation, see vol. i., chap. x., pp. 239 and 248. If the land lies upon such a slope as may cause the dung to be swept off by the rains, then it should, however, be buried by a very slight ploughing.

‡ See the Reports of Essex, vol. i., p. 197; Bedford p. 276; Bucks, p. 128; Stevenson's Surrey, pp. 148 and 176; Malcolm's Surrey, vol. i., p. 268; Kent's Norfolk, p. 37; Gen. Rep. of Scotland, vol. i., pp. 347 and 419; and Loch's Improvements on the estates of the Marquis of Stafford.

‖ In Scotland, "*till*" is understood to imply, as a subsoil, a mixture of clay with sand and gravel, devoid of vegetable matter, and impervious to water. In Ireland, this description of soil is called "*Lackleagh*," and the pan which it forms is there broken up with a plough of immense weight and strength, called a "*miner*," which

ground, and bring in their train a long list of noxious weeds, were they not corrected by the process of perhaps more than one summer fallow, together with an application of both lime and dung; and it is also true, that even if these substances can be readily obtained, yet the expense, even if repaid by the land, may not suit the farmer's pocket. Under ordinary circumstances, indeed, large operations of that nature, which are intended to effect a permanent improvement in the soil, cannot be considered a coming within the scope of common farming and can only be undertaken by the owner of the land, or on terms which will secure the tenant in the return of his outlay; for it should be clearly understood that in no case can it be effected without either the assistance of extraneous manure, or by the sacrifice of a portion of that which properly belongs to the usual cultivation of the farm, and might, therefore, probably be more advantageously applied to the support of the soil already under tillage.

Neither should *poor soils* be ploughed deep; for the vegetative mould with which the surface of land of that description is covered, having been formed by the decomposition of the scanty herbage which grew upon it when in a state of nature, is proportionably thin, and the subsoil on which it reposes consisting generally of sterile materials, it will be found bad policy to mix them with the upper stratum, which, though perhaps not very productive, yet requires the whole power of the small portion of manure which it furnishes to preserve it in tolerable condition.* This, more especially, if it be intended to return the land to grass; for the sward seldom penetrates farther than about two inches into the ground, and its value, therefore, depends chiefly upon the fecundity of the surface upon which it rests. Thus the generality of those farmers who are situated upon wolds and downs, carefully avoid ploughing below the top-soil; for when there is a vein of rubbly chalk, or of small broken flints, immediately under the topsoil, they look upon it as "the dross of the land," and that, if ploughed up, it is quite poison to the field.†

If the land be of a sandy nature the ploughing of which has been always carried to one depth, and that a pan has thus been formed underneath, in that case, also, it is judicious to break it up; for, independently of the labor of the operation, the surface may have been much ameliorated by good culture, and the hard crust which lies at the bottom both secures the manure from being carried down below that part which is actually tilled, and also prevents the escape of humidity from the upper stratum. Another layer of sand, indeed, not unfrequently exists under the pan; for that species of crust is often found where land has been much marled; but although it might be desirable to have it at a greater depth, yet its removal is a work of extreme difficulty, and, on such soils, will rarely repay the expense. On sand veins where there is a great depth of soil, and in which no obstruction of this kind is found, it is however not unusual to plough very deep, and to have a second plough following in the furrow of the first, so as to throw up new soil, and to bury that which is supposed to be exhausted: as is the case in many parts of Devonshire.

In fine, it will, in most cases, be found inexpedient to add to the stratum already under tillage by any other means than those which little by little may gradually tend to increase the depth of vegetative mould by the mixture of small quantities of the virgin earth of the subsoil with the surface; but if a more extensive operation be comtemplated, then the following questions may be not unaptly put before coming to a conclusion.

1st, What return may be expected from land, the subsoil of which has not yet been submitted to the plough?

2ndly, What change will be occasioned, either by the increase or diminution of the tenacity, or of the friability of the land, by the admixture of the subsoil with the surface?

3rdly, What quantity of manure will be required beyond that already disposable upon the farm?

And 4thly, What will be the entire cost?

To solve which, the earth should either be submitted to a chemical analysis, or its qualities ascertained by spreading some of it, to a certain depth, in a garden, and sowing seeds upon it. The probable improvement in the soil may thus be ascertained, and the supposed increase in the future crops, when compared with the expenditure, will determine the propriety of the experiment.

We have not hitherto touched upon the subject of the *actual depth to which ploughing is commonly carried*, nor is it necessary to say much regarding it; for it of course depends more upon the state of the land and the judgment of the farmer than upon any general rule. The usual operation is generally confined to from four to five, and rarely exceeds seven inches; though, in the hundreds of Essex, and some other districts where the soil is rich and deep, it is sometimes carried as far as nine. An opinion is indeed entertained that, if carried deeper, more manure is necessary to ensure a crop; and it will be readily admitted that, were this idea well founded, it would form a strong argument in favor of moderate depths. It is, however, only justly applicable to land of which the subsoil is inferior to the surface; for when this is of the same quality with the cultivated part, not only can no injury arise from gradually incorporating it with the tilth, but benefit will be derived by all plants which penetrate far into the ground, as they naturally absorb their nutriment both from the soil and the manure with which it is mixed. It must, however, be admitted that when ground is suddenly ploughed to an unusual depth, it increases the difficulty of destroying weeds. This is particularly observable in thin stapled clays, on which they spring up as if indigenous to the soil; it is therefore obvious that no benefit can be derived from ploughing such land deeper than common, unless it be done in the manner we have already pointed out.

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acts without a mould-board, and is followed in the furrow by another plough of the common power. See vol. i., chap. xxix., p. 465.

* "The Norfolk farmers, generally possessing a thin light soil, with a poor and barren subsoil, prefer shallow ploughing at all times, and argue that it is easier to keep a small quantity of soil in good heart than a greater quantity, which would be formed by deep ploughing."—*Dumfries Rep., App.* p. 578.

† "Many instances are shown where land of this kind, ploughed too deep upwards of twenty years ago, has not yet recovered its former goodness; and, to keep the top-soil as deep as possible, the best farmers will not permit the surface flints to be picked off for the roads, lest it should make the land both lighter and thinner."—*Davis's Survey of Wiltshire*, p. 52.

ON THE NECESSITY FOR PROPER INSTRUCTION IN THE ART OF REELING SILK.

To the Editor of the Farmers' Register.

Philadelphia, Feb. 26th, 1840.

DEAR SIR—I am exceedingly obliged to you for the valuable present you have been pleased to make to me of a series of the Farmers' Register, for 1839, and January No. of the present year: I beg you will accept for it my grateful thanks. Although I do not profess to be an agriculturist, yet I have always felt the liveliest interest in the progress of agriculture, considering it as the nurse of mankind, of which commerce and manufactures are but the handmaids.

I am happy to find that you pay considerable attention to the culture of silk, an article to which this country will one day be indebted for immense riches. The great question at present is, how to make it profitable? I observe in the last number, for January, that it is not doubted but that a great quantity of cocoons will be produced in the course of the present year; and there can be no doubt of it when we consider the large bounties given by some of the states for their production. But, it is asked, what shall we do with them? To this question your correspondent answers, by recommending to the farmers to reel their silk from their cocoons; but he does not say how that reeled silk is to be employed. I presume that he believes that it will be immediately manufactured. Your correspondent is very sanguine on the subject; he says that he has seen silk reeled by an American farmer who had never been taught the art, which was mistaken by a connoisseur for Italian silk. I should be very happy if this should prove to be the case; I have, however, strong doubts upon the subject. I believe the art of reeling silk from the cocoons requires teaching and experience, and that it is not to be learned by intuition. Whether I am right or wrong, this is an important question, which has produced in this country many different opinions, and which ought at last to be set at rest. I am happy to have it in my power as a first opportunity now offers to decide it definitively.

In our large cities, and in several country places, from Boston to Philadelphia inclusive, there are manufactories of sewing silk, with competent machineries, directed by skilful throwsters, chiefly emigrants from England. These factories, going on under the protection of a duty of forty per cent. on foreign sewing silk, are in great want of the raw material, and are obliged to import it in large quantities from China and Bengal. This foreign article, which is by no means of the first quality, sells in our market for $5 a pound. Now, sir, it is very plain that there will be no market this year for the purchase of cocoons, as there is no filature established any where that I know of; but there will be an abundance of markets for the purchase of reeled or raw silk; and if that reeled by our farmers is equal to the Italian, it will readily sell for $7 a pound, which is the price of Italian raw silk in England; and if inferior, it will at least produce the same price with China silk, which is $5. There cannot be a fairer opportunity to test this long controverted question, and ascertain the real value of American raw silk. It is only by such facts that the correctness of the discordant opinions can be finally decided upon.

I beg you will excuse my employing another hand to write this letter; the weakness of my sight obliges me to have recourse to this method. Again accept my thanks for your very valuable present, and believe me to be, very respectfully, dear sir, your most ob't servant,

PETER S. DU PONCEAU.

[In the circumstances in which the venerable writer of the foregoing letter has been placed by age and infirmity, its dictation was a task which we did not expect from, nor desire to have imposed upon him. Being so freely performed, however, it is so much the more gratifying, and valued, as a testimonial of the writer's kind approval of our labors, and of his still unwearied zeal for the establishment of the public benefit by silk-culture, which is the subject of his remarks, and to promote which, he has been one of the earliest, most zealous, and certainly among the most disinterested of laborers.

Mr. Du Ponceau maintains, as heretofore, the difficulty of the art of reeling silk, and the necessity for its being regularly taught. In this he is opposed by the much more general belief of the great facility with which the art may be acquired. Being totally without practical knowledge on this controverted point, we offer no opinion of our own, but wish to present fairly the opposite opinions of others. But whether the difficulty may be too much magnified by the one opinion, or too much underrated by the other, there can be no doubt of the immense advantage of a skilful and experienced reeler *commencing* the operation in a region where silk-culture is but just begun. Many places in the middle and southern states will this year offer profitable and sufficient business for a single capable reeler, though it might not be safe to establish a regular and extensive filature *in advance* of the large and regular business of feeding worms, which we trust will proceed with regular increase from the trials of this year. In all the principal towns of Virginia, Richmond, Norfolk, Petersburg, and Fredericksburg, good reelers would this year find extensive employment in the crops of cocoons that will be made in the environs, and would make for themselves good profits, both by their work and by instructions of others, as well as render most important public service. For the latter object, as well as for individual benefit, in the instruction afforded, each considerable feeder of silk-worms in the vicinity might well afford to pay his share of a large pecuniary premium to induce the establishment of a reeler, in addition to the payments for particular services rendered. This ought to be an object especially attended to by societies formed for aiding the promotion of silk-culture.—ED. F. R.]

SKETCH OF THE CAUSES OF THE PRESENT FINANCIAL PROSTRATION OF THIS COUNTRY.

"Again: is it not equally clear that it was the magnitude of the surplus [revenue,] and not the removal [of the deposites] of itself, that caused the after derangement and disorder? If the surplus had been but two or three millions, the ordinary sum in deposite, it would have been of little importance where it was kept; whether in the vaults of the bank of the United States, or those of the states; but involving, as it did, fifty millions and more, it became a question of the highest importance. I again ask, to what is this great surplus to be attributed, but to the same cause? Yes, sir, the tariff of 1828 caused the surplus, and the surplus the removal and all the after disasters in the currency, aggravated, it is true, by being deposited in the state banks; but it may be doubted whether the disaster would have been much less, had they not been removed. Be that, however, as it may, it is not material, as I have shown, that surplus itself was the motive for the removal. We all remember what occurred after the removal. The surplus poured into the treasury by millions, in the form of bank notes. The withdrawal from circulation, and locking up in the vaults of the deposite banks, so large an amount, created an immense vacuum, to be replenished by repeating the issues which gave to the banks the means of unbounded accommodations. Speculation now commenced on a gigantic scale; prices rose rapidly, and one party, to make the removal acceptable to the people, urged the new depositories to discount freely, while the other side produced the same effect, by censuring them for not affording as extensive accommodations as the Bank of the United States would have done, had the revenue been left with it. Madness ruled the hour. The whole community was intoxicated with imaginary prospects of realizing immense fortunes. With the increased rise of prices began the gigantic speculations in the public domain, the price of which, being fixed by law, could not partake of the general rise. To enlarge the room for their operations, I know not how many millions, (fifty, I would suppose, at least, of the public revenue) was sunk in purchasing Indian lands, at their fee simple price nearly, and removing tribe after tribe to the West, at enormous cost; thus subjecting millions on millions of the choicest public lands to be seized on by the keen and greedy speculator. The tide now swelled with irresistible force. From the banks the deposites passed by discounts into the hands of the land speculators; from them into the hands of the receivers, and thence to the banks; and again and again repeating the same circle, and, at every revolution, passing millions of acres of the public domain from the people into the hands of speculators, for worthless rags. Had this state of things continued much longer, every acre of the public lands, worth possessing, would have passed from the government. At this stage the alarm took place. The revenue was attempted to be squandered by the wildest extravagance; resolutions passed this body, calling on the departments to know how much they could spend, and much resentment was felt because they could not spend fast enough. The deposite act was passed, and the treasury circular issued; but, as far as the currency was concerned, in vain. The explosion followed, and the banks fell in convulsions, to be resuscitated for a moment, but to fall again from a more deadly stroke, under which they now lie prostrate."—*Debate in Congress.*

MALARIA AND MILLPONDS.

To the Editor of the Farmers' Register.

Washington County, N. C. Jan. 6, 1840.

The 'Essay on Malaria' I read when it first made its appearance, in the sixth volume of the Register, with great interest. I thought I knew every word of it to be true, from long observation and suffering from the ignorance of those facts in early time. But for more than twenty-five years I have been fully convinced of the great cause of most of our sickness in this country—stagnant water, and mud exposed to a hot fall sun; and have spared no labor and cost in my power to avoid them. One of the strong reasons for moving my house at ——, from my father's location, was to get it farther from the ——— river swamp, and though it was but two hundred and fifty yards, I have no doubt of having long since been remunerated for the cost in the health of my people, though it has been but six years. It is a work which ought to be in the hands of every man who lives in the low country, or bilious fever region of our country. I hold the right of property inviolable, except in cases of life and death; but were I living in the neighborhood of a *millpond*, I should consider the right of property in it no more than that of a tame bear, that was devouring my child. To calmly sit by and see all one's children and dear companion as pale as corpses, in a short time violent disease, and, after watching with the utmost anxiety, to follow to the grave those dear objects of your love, perhaps one after the other until all are gone, and to know that all those heart-rending sufferings arise from the malaria of the various millponds in your neighborhood, must evince a degree of forbearance beyond Christian, and an obduracy of heart, in the owner of mills, almost equal to that of cold-blooded murder. If I know any thing that would induce me to accept the dictatorship of a country, it would be that of having the power to constrain the inhabitants in the bilious fever region to remove all stagnant waters from it, and to keep all arable land in the fall covered with vegetation, and thereby sheltered from the power and influence of the sun. * *

For the Farmers' Register.

BULLETING FOR SPAYING.

Little Rock, Ark. Dec. 27th, 1839.

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I have tried spaying pigs with shot. [Described in an article in the Farmers' Register.] The experiment has been tried by Mr. William Wilson also, and other careful farmers in this vicinity; and, so far as I know, every experiment failed to produce the desired effect. I am fully of the opinion it is not worth the attention of the farmer.

ALLEN MARTIN.

PRACTICAL RESULTS, AND OPINIONS THENCE DERIVED, ON SILK CULTURE IN DELAWARE.

To the Editor of the Farmers' Register.

Dagsboro, Delaware, Feb. 18, 1840.

In answer to your inquiries as to my silk culture, I may say I have been, or rather Mrs. Waples has been, somewhat engaged in it, for about three years. When I first commenced the business, my object was to introduce the culture of it into our county, believing then, as I now do, that it would be of an incalculable advantage to a district of country like ours. I began by raising the white Italian mulberry, for food for the worm—presuming then, from information received, that that species of mulberry would suit our climate, doubts then being entertained whether the morus multicaulis would stand our winters; consequently I had procured many of the white mulberry, upon which I have principally fed my worms. Two years ago, I procured some of the morus multicaulis, and have turned my attention mostly to the cultivation of them, and am progressing with them for standard trees as food for the worms. I have had no intention from the beginning of speculation upon the morus multicaulis. I sold a few to two of my neighbors, which about paid me for the first cost of mine. From some cause, which I can't account for, the cuttings of one and two buds which I planted last spring, nearly all failed; but as things have turned out, my loss will be nothing; for I have enough for my own use, and to sell them would be next to impossible. The great rage for speculation in that article has, for a while, played the mischief with the progress of the silk culture; as the great loss of speculators has caused many, very many of the people (otherwise well disposed towards the rearing of silk) to believe that it is all a humbug. These, you know, are the days of humbug. But now is the time for those who intend rearing silk, to stock their farms with the morus multicaulis. I intend to keep a goodly number of the white mulberry for a resort, if necessary. I find not much difference in the two kinds for food; but in the gathering, one hand can gather more food from the morus multicaulis, than five hands from the Italian mulberry. The worms are fond of both of these species, and they make equally as fine silk; but from the easy propagation and the facility of procuring the food, I much prefer the morus multicaulis. I fed last year about 300,000 worms. The cocoons were fine, of good size, and of a fine texture; said by judges to be equal to any they ever saw. I propose this year, if nothing happens, feeding from half a million to a million of worms. Heretofore I have kept no account of expenses or cost of any thing in the premises; I have gone on in this business entirely with my family, and in a manner not to interfere with my other business; making this business almost entirely an extra one—having done the principal part of the work with a negro woman and black children, the latter of whom, but for this business, would be doing little or nothing. I propose keeping an account of all the ins and outs this year—and if I should live, will try and give you a particular account of our doings in the silk for the year 1840. This much I am fully persuaded of, that it can be made a profitable business, and particularly in a family way. There is no doubt with me, but that every family in our community might raise from fifty to one thousand dollars worth of silk a year, (according to the numbers of the family,) with but very little interference with their ordinary business. If so, and I have no doubt of it, if it could be generally introduced, what an amount of money would it come to yearly? I have now full faith in the multicaulis standing our winters; mine thus far are not injured the least, although our winter has been what we call a hard one. At some other time I will give you my idea on manuring and farming.

With sentiments of the highest respect, your friend, WM. D. WAPLES.

DELIGHTFULNESS OF THE CLIMATE OF SOUTHERN FLORIDA, GOVERNMENTAL NEGLECT AND ABUSES, AND THE MEANS OF REMEDY.

To the Editor of the Farmers' Register.

Indian Key, Tropical Florida,
1st January, 1840.*

A happy new year to you! But what a contrast between the weather and vegetation of Petersburg at this very hour, when compared with the weather and vegetation of Indian Key. Can you realize the fact that this coral rock of twelve acres is covered with ever-verdant foliage and ever-blooming flowers? On the 12th December, 1838, my family embarked amid the cold desolation of the season at New York, and on the 25th December, 1838, my family arrived, amid the cheering consolations of the same month, at Indian Key. My many years of previous residence in tropical climates debarred me from enjoying all the pleasure of absolute novelty in this speedy transition from the leafless vegetation of the snowy hills of New York to the evergreen woods of the never-frosty Keys of Tropical Florida. But my Northern family was greatly astonished and highly delighted with the magical change, from the cold and gloomy scenery of December in the latitude of New York, to the warm and brilliant scenery of December in the latitude of Indian Key. They have now passed one year and five days amid the physical enjoyments derived from the weather and vegetation alone of Tropical Florida; and they are now as well convinced as I am myself of the superlative delightfulness and the superlative healthfulness of the tropical climate of South Florida. They have relinquished the society of their friends and acquaintances at the pleasant village of Palmyra, Wayne County, New York; they have spent a year at this village islet of six families, in my temporary dwelling, which has necessarily been my family fortress or domestic prison; and they are still as anxious as I am myself to be transferred to the still more solitary enjoyments of the desert wilderness on the adjacent mainland of the Peninsula. All men who are practically acquainted with the first settlement of any new country must well know that, during the first years, their own minds and their own families must necessarily constitute their only "good society." He who cannot find sufficient enjoyments in his

* Lat 24° 48′ N. Long. 80° 55′ West. Heat 70° to 72° Fahrenheit.

own head, with his own family, or in his own hands on his own lands, is not fitted for a pioneer in any new settlement, and especially in the southern extremity of Tropical Florida. But such are the attractions of even a desert wilderness with a tropical climate under our free government, that even my children now can appreciate the great trouble of my frequent dreams at Campeachy. The great affliction of these perverse imaginations consisted in their whirling me from the Gulf of Mexico over the Peninsula of Florida, and in finally dashing me down amid the snow and ice of the Peninsula of Michigan! And even now the greatest annoyance of my troubled dreams always consists in their malicious transportation of my shuddering frame to the frosty regions of the northern states. How many years have I fruitlessly labored to convince the American people that the most slandered section of their immense domains is the most desirable district in the union for the physical enjoyments of the human race. Would the Seminole savages cling so pertinaciously to the slandered everglades of South Florida were they not in reality the most desirable district in the United States for the physical subsistence of the poorest people? Superadd intelligent management to physical labor in this productive climate, and an earthly paradise on the poorest lands may soon be created by the poorest hands. During my travels in the Northern States, in August, 1838, I visited the costly garden and costly hot house of the reputed possessor of millions of dollars. The extravagant expenditure of ostentatious wealth was exhibited even in the sashes of varnished mahogany and the panes of plate glass which surrounded his magnificent collection of tropical plants. Very natural, however, was my incidental remark, that the poorest man in Tropical Florida could easily collect a much finer exhibition of tropical plants around his humble habitation. Indeed you will readily conceive that the garden of Eden itself must have been located in a tropical country. Did *you* ever dream of any frost or ice among the bowers and flowers of the first garden, of the young world? How long would any naked couple remain alive in any garden of Virginia? The fig leaves which formed the first clothing of Adam and Eve, were not they the gigantic leaves of the fig banana, now growing on this coral rock of Indian Key? And whence came the *thread* to stitch these leaves together, unless from the *petioles* which compose the stalk of the same banana? When these first poor people of the young earth were driven out of the first garden into the universal wilderness of the eastern world, they become the pioneer squatters on public lands. Yet remark and remember, there was *not* then any vegetable mould, there could *not* be any rich black soil, on any surface of the recent earth: yet vegetation flourished; and these pioneer squatters of the human race found sufficient subsistence in the desert wilderness of the eastern hemisphere. I allude to these primitive facts, in this primitive style, because all emigrants to Tropical Florida must be pioneer squatters on public lands. The first squatters of the United States were the pioneer settlers at Jamestown and at Plymouth; and degenerate must be the descendants of those pioneer squatters, if they dread the minor privations and minor dangers of pioneer squatters near Cape Sable and near Cape Florida. As truth is mighty and must prevail, I have no doubt that in a few years Tropical Florida will be densely crowded with poor propagators of perennial plants. All that is requisite to attract emigrants in shoals is to make them effectually acquainted with the irrefutable realities of the superlative delightfulness of the tropical atmosphere, and the superlative productiveness of the calcareous earth of South Florida. Yet, such is the force of the national prejudices of national ignorance, that I have been compelled, through the senator and representative of South Florida, to suggest to the legislative council of the territory, the urgent expediency of their official corroboration of the irrefutable reality of the superlative healthiness of the delightful climate of Tropical Florida!!! Yet, after all, the first settlers of South Florida will likely be composed of the most intelligent men over forty years of age, who have much travelled experience of the United States and of other extensive portions of the world. An emigrant from the Atlantic states, after five years' residence in the North Western States, three years' residence in the South Western States, two years in Texas and one year in Cuba, will much more likely become a contented permanent settler in the desert wilderness of Tropical Florida, than any other person with less personal experience. Such a settler will be sustained, like the ancient Israelites in the sandy desert, by confident faith in his future enjoyment of the fig and the vine, the milk and the honey of the promised land. Like the Christian of all ages, he knows that he must pass through the shadows of tears to emerge into the lights of joys; that he must travel through a narrow, rugged path, to reach the broad blooming garden of Eden. You will hence readily conceive that very few native inhabitants of our Atlantic states can possess the requisite qualifications to render themselves happy in Tropical Florida. He or she who would not cheerfully reside in the original wilderness of Virginia, for the virtues of a medicinal spring alone, cannot cheerfully reside in the desert wilderness of South Florida for the virtues of its tropical weather alone. Indeed I would advise South Florida to be avoided by every person who cannot cheerfully abstain from the use of tea, coffee, chocolate and sugar, until he can produce them with his own hands!!! Yet there are philosophical minds in the travelled bodies of some actual residents of the Atlantic states, which can appreciate the enjoyments of even a desert wilderness with a tropical climate under a free government. They know that even the primitive earths of any tropical district abound with vegetable wealth and beauty. They know that in a tropical climate the most valuable vegetables are spontaneous productions of the most arid soils; and that *water* alone is the only essential auxiliary to the most luxuriant vegetation of the most precious plants of the whole world! *You* know that the whole vegetation of infant creation was the natural generation of universal irrigation!! When "the Lord God planted a garden eastward in Eden," and when out of the primitive "ground" he thus "made" to grow every tree that is pleasant to the sight and good for food, he also made a river to water the garden, in which he put the man "to dress it, and to keep it," by easy irrigation! Indeed, wherever the ancient country of Eden may now be placed by modern travellers,

you can probably quote their incidental observations, which will clearly show that the principal earth of each conjectural location is the calcareous earth of Tropical Florida! Your own pen has frequently shown the astonishing fertility of calcareous earth with simple irrigation; and your own pen can clearly explain the momentous fact, of national importance, that the vivifying waters of the slandered everglades are liquid mines of vegetable wealth for South Florida. You know that a verdant oasis in an arid desert is barely the vegetative result of a spring of water in a waste of sand! The ancient and modern histories of the eastern hemisphere abound with facts which prove that wherever water was brought into any desert, vegetation flourished, population accumulated and cities rose; and that wherever water was withdrawn, vegetation decayed, population perished and cities fell!

You have quoted Madden's Geological Observations in the desert between Egypt and Judea, which sustain his belief that a solid bed of limestone is the basis of the soil of all Egypt; and Denon's Geological Observations on the Lybian range of calcareous mountains, which show the facts that their daily decomposition furnishes the calcareous sands which gradually encroach on the cultivated plains and populous villages of the productive valley of the Nile, and dreadfully change those scenes of vegetation and population into sites of barrenness and of desolation. Yet you truly remark, that wherever, by canals, are conveyed the waters of the Nile to irrigate the calcareous sands of its arid borders, an astonishing fertility has been the immediate consequence; and that wherever these canals have ceased to convey these waters, those calcareous lands have again become naked and barren sands. But by my communications, you have perceived that the basis of the soil of all South Florida is also a solid bed of limestone; that the arid sands of all South Florida are also calcareous sands; and that hence an astonishing fertility of even its naked lands must also be the immediate consequence of appropriate irrigation in South Florida; and you can therefore appreciate the vast importance of my principal position for the vegecultural improvement of Tropical Florida. "The fertilizing waters of the mosquito-less everglades are more elevated than the sterile sands of the mosquito-full coasts; and hence the same canals will drain the excessively humid soils of the interior, and will irrigate the excessively arid soils of the shore; and they will thus distribute the appropriate proportion of fertilizing moisture for the most flourishing vegetation of the whole slandered surface of Tropical Florida." Indeed whenever a governmental survey of this slandered district shall be finally ordained, the special surveyors must possess all those extraordinary qualifications which can only be acquired by long observations in the regions of irrigation, in the south of Europe, the north of Africa, or in Tropical Asia. South Florida is an extraordinary country, with every thing extraordinary in its geographical position, in its geological formation, in its chemical composition, in its substratum and subsoil, in its surface and surface soil, in its tropical climate, in its tropical vegetation, and even in its tropical animation, from the minute insect of its coral rocks, to the huge manati of its calcareous coasts. The position, then, is self-evident, that an extraordinary country requires extraordinary legislation by extraordinary legislators. But in the congress of the United States, what member of either house has extraordinarily studied the extraordinary phenomena of Tropical Florida, with the single exception of the scientific senator, Doctor Linn? An extraordinary country requires extraordinary government by extraordinary governors. But under all our successive governments of the United States, what member of any cabinet has possessed the extraordinary qualifications for an extraordinary appreciation of these extraordinary circumstances of Tropical Florida, with the single exception of the travelled statesman, the actual secretary of war? It is furthermore self-evident, that in any extraordinary country the extraordinary extirpation of ferocious beasts must necessarily be accomplished solely by extraordinary hunters with extraordinary premiums: and that hence, with such motives by such men alone, will ever be caught, or even sought, the savage murderers in South Florida, at the only sites where they can ever be found. Now, he that hath ears to hear, let him hear! He that hath understanding to study, let him study! The same extraordinary circumstances which have forcibly prevented, and which will forcibly prevent, the agricultural settlement of South Florida, the same extraordinary circumstances have greatly prolonged and will greatly prolong the Seminole war in South Florida. The extraordinary governmental privation of desert freedom to individual industry in the deserted district was the principal occasion of the beginning of the Seminole war, and is the principal cause of the continuation of the Seminole war in the same deserted district. The extraordinary circumstances of the only private population of South Florida in their only locations and only occupations along this wrecking and this rumming reef, readily afford positive proofs of their extraordinary interests in the extraordinary prolongation of this extraordinary war. The extraordinary circumstances of the only public troops in South Florida in their only positions and their only operations along this rumming and this wrecking reef, naturally afford presumptive proofs of their extraordinary interests on the extraordinary prolongation of this extraordinary war. But the extraordinary combination of these extraordinary circumstances, along this extraordinary wrecking and rumming reef, very naturally produce extraordinary considerations of dependent interests, defenceless timidity and scheming policy, which necessarily disincline and disqualify almost every private resident from the patriotic discharge of the dangerous duty of nationally public promulgation of locally notorious facts. Hence the same extraordinary combination of extraordinary circumstances necessarily generates the extraordinary result, that locally notorious facts of nationally immense importance cannot ever be officially proved to the executive departments in Washington. To this extraordinary promulgation of extraordinary realities, I now add the extraordinary individual position of extraordinary national importance, that ☞ the immediate restoration of desert freedom to the deserted district of South Florida is an essential means for the speedy termination of the Seminole war.

Very respectfully, your ob't. serv't.,

HENRY PERRINE.

DANDOLO'S WORK IN ITALIAN. DOMESTIC INDUSTRY AND PRODUCTS OF ITALY. CALCAREOUS SOILS FOR VINES.

To the Editor of the Farmers' Register.

Habersham County, Ga., Feb. 17, 1840.

You have expressed a desire to obtain a copy of Dandolo's work on silk, in the original Italian. I have sent a copy of it to my father at Washington, with a request that he will forward it to you by the safest conveyance. If you need it only for a limited time, I should be glad to get it again, as, in this country, this work is rarely found. If, however, it is very necessary to you, I presume you would prefer keeping it. This you can do, as it will be of more public benefit in your hands than in mine.

You may desire to know how this book (the only one perhaps in the United States of the kind) found its way into the heart of the mountains of Georgia. I will tell you, as it will serve as an introduction to a remark upon the cultivation of another article too much neglected in our agriculture, viz: the grape. Several years ago, then little more than a boy, I found myself in Italy. One of my chief pleasures consisted in visiting the small farmers whenever I could find an excuse for entering their dwellings, and conversing with them in imperfect Italian. This was not often; but I learned nevertheless with surprise, "that the silk and Leghorn plait, [for bonnets, &c.] made by the women and children of a Tuscan farmer's house, often constituted all their gains; that bad crops, taxes and the landlord's share, frequently took all the profits and left him nothing." I learned moreover, that the sum total of the amount gained to the state by these "small operations," was no small sum, and, added to the produce of the olive tree, might be said to constitute the chief means of existence of the poorer class. These facts produced one of those undefined dreams of patriotism, to which I believe all young men are subject, and under its influence I bought this book, studied it, and otherwise obtained knowledge on the subject, with the vague idea that it would be one day useful. It is likely to turn out so.

The whole soil of southern and middle Italy is more or less calcareous, either naturally, or from volcanic ashes. And in no place, that I examined, did I find a peculiarly fine vineyard but in a soil highly calcareous, and very deep, (either naturally or made so,) and generally very dry. The vine which produces the *Lachrymæ Christi* wine, grows on a perfect heap of volcanic ashes and scoriæ, very light, and very dry. The finest grapes I saw in Naples, grew on the ashes of the Monte Nuovo; and some parts of Champagne in France, producing the finest wines, seemed to me altogether of marl, in a state of dust. Upon these views, I tried a small experiment last summer.

I had two beds in my garden dug two feet deep. They were separated by a broad walk, which had never been dug, so that there could be no communication between them, unless through 18 inches of solid red clay on each bed; I transplanted there vines as nearly under the same circumstances as I could. They did not thrive well, having no manure of any kind. Early in the summer, I put on a very large quantity of lime (well slacked and left in the air for some weeks,) on three of them. In the fall, the vines thus treated were twice as large as the others, and the leaves were green during a drought of six weeks. The soil was six inches of sand on a subsoil of stiff red clay, on the top of a hill as poor and as dry as can be found any where. The lime was all the manure the vines had, and that in quantity sufficient to have killed most plants.

I shall leave the six as they now are, and in the course of time, inform you of the results of the experiment. An isolated experiment can only help to establish a fact. It is with this view, that I state the above; and not that I consider it either a discovery or even novelty.

Excuse this hurried and ill-digested letter; I had no intention of troubling you with so long an epistle. I could not leave off in the middle, and I could not spare time to commence another, and be in time for the mail.

I am, sir, yours respectfully,

R. W. HABERSHAM, JR.

[We take the liberty of publishing the above letter, because of its matter of public interest, though it seems to have been meant as a private letter. It was elicited by an advertisement which (after trying in vain all other means) we placed on the cover of the January No. of the Farmers' Register, requesting to be furnished with a copy of Dandolo's treatise in the original language. On February 29th, the book above promised was received, and for which we are greatly obliged to Mr. Habersham's kindness. It is, however, *not* the original work which was especially desired, but an abridgment of Dandolo's first edition, by another hand. Still, it affords to some extent the means of proving and correcting many of the numerous errors of the French and English translators and copiers of Dandolo; and if to clear away something more of the enormous mass of error so derived, and heretofore received without question in this country, will be a service to silk-culture and to agricultural interests, we trust that Mr. Habersham's anticipations, of his favor to us leading to public benefit, will not be disappointed.

Mr. Habersham has struck upon the true secret of the cause of the superiority of European vine-culture and wine-making. At sundry places in our past volumes, we have offered the same opinion, and urged the cultivating the vine in this country on calcareous soils. His experiment is interesting, and doubtless will present results that will show the great benefit of even superficial liming to vines. But if the new calcareous ingredient had been diffused through the whole two feet depth of dug earth, it would have been much better. For we are satisfied that a highly calcareous subsoil, as low as the roots will penetrate, as well as the upper soil being calcareous, is necessary to the greatest perfection of vine-culture.

But even if made sufficiently calcareous, the original subsoil of "stiff red clay" will never be made favorable to grape-culture, as if sandy and gravelly.—Ed. F. R.]

NATURAL CAUSES OF THE UNNATURAL FALSEHOODS OF THE UNHEALTHINESS OF THE CLIMATE AND UNPRODUCTIVENESS OF THE SOIL OF THE FLORIDA KEYS.

To the Editor of the Farmers' Register.

On the authority of Williams, the tropical islands called the Florida Keys, commence in 25° 35′ north latitude near Key Biscano, and terminate in 24° 32′ north latitude at the Tortugas Shoals. By the same authority, the longitudes of the same points counted west from Washington, are 3° 13′, and 6° 10′ west longitude. In other words, the Florida Reef has a curving extension through 63 miles of latitude and 177 miles of longitude south and west of Cape Florida. Now the whole extent of this desolate reef has always been infested by wreckers and by drinkers to so great a degree, that it merits the exclusive title of the wrecking and rumming reef of South Florida. Hence, at the acquisition of the territory in 1819, the only population of the Florida Keys was necessarily a transient population—a cruising population—an exclusively wrecking, fishing and drinking population. They were hence a greatly anti-agricultural population with greatly anti-salutary habits; and hence they could not, or would not discover any agricultural productiveness in the calcareous soils of these arid keys; and hence, also, they could and would attribute any fatal results of the habitual imbibition of liquid poisons, to their habitual inhalation of the noxious miasma of an unhealthy climate. They saw that these rocky islands were densely covered with the most vigorous growth of the most valuable trees, and yet they said that these soils were barren soils. They were constantly destroying the most precious woods of the tropics, and yet they declared that the islands on which they grew were entirely composed of the most unproductive soils. They were constantly plundering the most valuable naval timber of the world, and yet they cried that the soils in which they flourished were entirely worthless soils. Various vegetables for food were indigenous to the soil, and other edible plants ran wild on these keys, and yet, these anti-agriculturists maintained that these productive soils were sterile soils. Genuine mahogany, Campeachy teak, tropical mastic, more valuable than the celebrated live oak under the special protection of the United States government, have hence continued to be destroyed during the 20 years that these invaluable trees have been within the jurisdiction of the United States' government. A single acre of these slandered keys is naturally covered with tropical plants, which, in the green houses and hot houses of the northern states and of Europe, would be worth from one thousand, to one hundred thousand dollars. And yet these calcareous islands continue to be regarded *as totally unworthy of any serious attention* by the government and by the people of the United States.

Respectfully yours, &c.,

HENRY PERRINE.

Indian Key, T. F., Jan. 20, 1840, *heat* 68°.

WINTER FALLOW.

From the (London) Library of Useful Knowledge.

The labors of winter fallowing, when intended for the preparation of spring crops, though conducted nearly in the same manner as those already detailed, are necessarily more confined in their operation: seldom, indeed, exceeding three ploughings, and not unfrequently consisting of only two; for it is a prevalent opinion that light soils—particularly if they be of a sandy nature—are frequently much injured by being overworked; and it is clear that they neither require, nor will bear, to be more pulverized than may be absolutely necessary for the destruction of weeds and the production of a good seed-bed. If the land, however, be of a firmer nature, and especially if it partake of the qualities of loam, the best practice is to give three ploughings, the last of which is preceded by the effectual operation of the grubber; for although strong loams with a good bottom, having been once thoroughly cleaned by a well-wrought summer fallow, may afterwards be kept in order by drilled crops, yet to maintain them in that condition requires the most constant attention and the most careful management, or they will again inevitably become foul.

The first of these ploughings should be given as soon as possible after harvest, and if it can be effected early in the autumn, then a second with a deeper furrow can be given in the course of the winter: the grubber follows when the weeds have begun to sprout in the spring, and the last ploughing is the seed-furrow.

It is thus that the sowings of the spring crops should be prepared; but on many farms both time and strength are wanting, and the tenants are obliged to content themselves with two ploughings, of which the first is not unfrequently very imperfect. Oats being a common crop on poor land, and being put into the ground early, are very commonly sown in this manner; but this species of culture is evidently insufficient for the destruction of weeds, or for the due amalgamation of the manure with the soil; so that the dung is sometimes found in the following year in hard lumps, like turf, which are not broken up without much difficulty, and it consequently cannot afford nourishment to the ground until the following crop. Those who trust to dung for the production of good crops of corn, should also consider, that unless the ground be previously relieved from the load of weeds with which it is encumbered, they can never expect it to produce the same benefit that it would if it had been brought into proper order.

It has not been unaptly remarked by a man of known experience in husbandry, that the science of agriculture is nothing more than an endeavor to discover and cure nature's defects; and the grand outlines of it are—"*how to make heavy land lighter, and light land heavier; cold land hotter, and hot land colder.* He that knows these secrets is a farmer, and he that does not know them is no farmer."* From want of attending to these general ideas, many absurd doctrines have however been propagated concerning it, and in no instance more than in that of fallowing land, which it has been very common to condemn in the gross, as a mere

* Davis's Survey of Wiltshire.

waste of labor and loss of crops. If by fallowing be meant repeated summer ploughings, it follows that on some lands it is proper, and on others totally wrong. It can never be right to make land lighter that is too light already; but there are few instances where strong heavy land can be pulverized too much. It may be replied that this pulverization may be as well effected under crops as in a state of fallow. On some soils it may; on others it cannot. In veins of rich sand, it has been found to be totally improper: such land will not bear a summer fallow; for it can never be made too close, if it can be kept clean; and on such a soil, this can be done better with a crop than without one.*

With regard to the system of fallowing in the northern districts of the kingdom, it is considered by most intelligent farmers as not generally suited to the more tenacious clays of the southern counties of England. The fallow-land on such soils, they contend, should not be broken up before it is dry in April or May; for if ploughed in autumn, and if the winter prove open, with much rain, it retains the moisture, becomes soured, and requires much trouble to get it dried for cleaning in spring. The treading of the cattle on such land, while ploughing, also does much mischief, for the impression of their feet will hold water when taking up the last two furrows of a ridge, and will, in a great measure, prevent the proper turning over of the furrow slice. In wet seasons the horses should, therefore, be always driven in the furrow. In some situations it is, no doubt, an easy matter to lay aside fallows, and to raise wheat after green crops; but we are borne out by the opinion of practical agriculturists of great eminence, in saying, that no man, who is generally acquainted with the soil and climate of Great Britain, will attempt to explode their use altogether. The essential points of tillage—besides preserving the land in heart with manure—consist in keeping it dry by drainage, and clearing it of weeds; if fallowed steadily, with perseverance and judgment, they are sure to succeed; but if negligently or imperfectly performed, no land, however cheaply rented, can leave a living profit to the farmer.

Having thus stated our opinion on the expediency of fallowing, we should be wanting in candor if we neglected to advert more particularly than by general mention of its opponents, to the opposite practice pursued for some years past, on heavy land, by the late Thomas Greg, Esq. and General Beatson: the details of which, although already before the public, are so pertinent to the subject of this chapter, that a further account of it cannot, we think, be deemed misplaced.

Greg's System.

The farm of Coles, near Buntingford, in Hertfordshire, consists of 240 acres of arable land, which is described as "a very tenacious clay, in some places mixed up with calcareous earth, which causes it to bind at top after heavy rain;" and was formerly worked nearly under a three course system of summer fallow, white corn, and pulse, or clover. Turnips were seldom sown, as the difficulty of feeding or carting them off was found to be injurious to the succeeding crop; and, consequently, only a small flock of 80 ewes or 140 wethers was kept, which was constantly folded during the summer. Upon this, and the observations regarding the disadvantages attending the similar plans of his neighbors, it is unnecessary that we should here offer any remark, for we know that they have been in many instances improved, and our more immediate object is to state the system afterwards adopted by Mr. Greg, and since followed by his nephew, during upwards of twenty years.

Having, as he tells us, "established in his mind as a general principle, that fertility was to be derived from pulverizing the soil, clearing it from water, and keeping it clean, he proceeded to inquire how those objects were to be obtained at the least expense; and he found that the best method to promote them was to reverse the whole system of the former cultivation." Accordingly, instead of ploughing four or five times only in summer and spring and fallowing every third year, he formed the determination "to plough only once for a crop; to plough only in winter; never to fallow the land in summer; to practise the row culture, and to use the horse-hoe." The mode in which he carried his plan into execution was as follows.

He divided the farm as nearly as possible into six equal parts, which are cultivated in a six-course shift, consisting of turnips; barley or oats; clover, standing two years; peas or beans, upon the ley; and lastly, wheat. The ground is marked out by a drill into ridges of five and a half feet in width, intersected by furrows often inches wide; thus leaving only fifty-six inches for each land, which is worked by a Suffolk swing plough, formed upon a construction to cut a perfect trench of seven inches deep, and requiring four bouts to complete the ridge, which is made sufficiently convex to describe an inclined plane of three inches from the crown to each furrow.* Thus water is prevented from remaining upon the land intended to be cropped, by being drawn into the ten-inch furrow, which is carried two inches deeper; the horses never tread but in a furrow; and by the soundness of this ploughing Mr. G. states, that, "when effected in the autumn or before Christmas, a perfect friability is obtained in the tilth by the influence of the frost during the winter, and the surface water may be as effectually got rid of as by under-draining."

As soon as the harvest is completed, the wheat-stubbles are haumed, and the lands are marked out and ploughed one bout: dung is then ploughed in to the amount of ten loads per acre, and three bushels of winter tares with a bushel and a [illegible] of winter barley are sown, to precede turnips to the extent of about half the ground intended for that crop, which, in common seasons, it does not impede, as the tares are cut upon a moist [illegible] for the turnip sowing.

The tare sowing being finished, the bean and

* In common fields, where the course is two crops and a fallow, or, as in some, three crops and a fallow, the report says that "on such soils, the fallowed year fills the land with more weeds than can be got rid of in the succeeding round of crops."—Surv. of Wilts., p. 56.

* Thus the first bouts are ploughed only four inches deep, which bouts are turned into one forming eight inches of soil in the centre of the lands. The second bout to be ploughed up to it, should be five inches deep; the third six, and the fourth nearly eight inches. See the Frontispiece of Mr. Greg's Pamphlet descriptive of the process.

pea stubbles are prepared for wheat; which is a difficult operation on heavy land, when the object is to get the seed early into the ground. The labor which they require from the plough, roll, and harrrow, was so great as to induce Mr. Greg to use a powerful grubber, or scarifier, of a form which covers an entire land; and it performed so well that he has since continued to use it instead of the plough, as he found that he could thus sow forty acres of wheat in a very few days, regardless of weather, and at a sixth part of the expense.

Having sown the wheat, the remainder of the land intended for turnips is ploughed and dunged. The ploughing is also performed for peas and beans; and it is desirable that these operations should be completed before Christmas. As soon as the season turns, the land which was ley, and intended for beans and peas, is scarified; and when the growing weather commences, the beans are drilled at fifteen inches for the convenience of horse-hoeing. The peas are next drilled; but as these, by falling over, preclude the possibility of hoeing them more than twice, they are sown at intervals of twelve inches.

As the ground is cleared of turnips, it is ploughed into lands. In the spring, the barley is drilled in rows of eight inches—not leaving any space for furrow—and the clover and rye-grass is sown up, and then across the lands.

As soon in May as weather permits, and the sun is sufficiently powerful to kill weeds, the scarifier is set to work, succeeded by a strong harrow; and having by these operations obtained cleanliness, the first favorable weather is made use of to sow Swedish turnips, or, should they fail, they are succeeded by white turnips, and in the event of a further miscarriage, coleseed is sown. With these, and the assistance of about ten loads of clover, and ten weeks' run on pasture in bad weather, 500 sheep are now kept on the farm, but lie enclosed at night in a spacious and well-littered yard. The fodder produced by straw and clover hay supports from forty to fifty head of cattle, and nine working horses are kept, which are soiled during the entire summer: thus so large a quantity of dung is made that no manure is purchased.

In this manner 200 acres are ploughed between harvest and Christmas, besides the cartage of dung and other odd jobs on the farm; but this is easily performed with the aid of the grubber, and the land being entirely ploughed in the winter, there is only the sowing of Lent corn to execute in the spring: the horses are therefore put upon green food, by which a considerable saving is made in the consumption of corn. Many other details of management are given in Mr. Greg's pamphlet, which is brief and well worthy of attention, but which we refrain from enumerating, as we only meant to call attention to the extraodinary statement which it contains of such a system of culture having been so successfully pursued upon land of that nature, as to yield an average, during six years, of the following crops, namely:

	per acre.
Wheat - - -	25 bushels.
Barley - - -	40 "
Beans - - -	35 "
Peas - - -	30 "
Clover twice cut -	2 tons.

Thus, after the deduction of rent and the interest of 2500*l.* capital, presenting, upon an average of six years, a profit of 671*l.* 3s., or 2*l.* 15s. 11*d.* per acre, and a result in favor of his mode of cultivation of no less than *an annual difference amounting to* 638*l.* 13s.*

Of the accuracy of the minute account thus furnished by Mr. Greg, we have no reason to doubt, though we confess ourselves somewhat sceptical regarding the justice of the conclusions which he has drawn respecting the superiority of his own plans over those of his neighbors; for every man, however high his honor and impartiality, is yet unconsciously biased in favor of any pursuit of his own, and no farmer could live upon the profit which he has assumed as that of cultivation under the old plan. On a subject of such vital importance to agriculture as that of the fallow system, we indeed deemed it prudent to apply to the present Mr. Greg for further information, which he readily afforded; and, from recent personal communication and correspondence, we are assured by him, "that his uncle's system is still pursued upon his farm with the best effect; as is evinced by the clean condition of the land, the heavy crops produced, and the quantities of stock maintained. The only alteration of importance made in his mode of cultivation subsequent to the publication of his pamphlet, was the substitution of a seven years' course, in place of that of six years, by which he obtained two crops of wheat—one on the clover ley, and another after the beans and peas. The annual course of cropping in the several years now, therefore, stands thus—

1. Turnips.	5. Wheat.
2. Barley.	6. Beans and peas.
3 and 4 clover	7. Wheat.

No material alterationhas been made in the implements; nor was any fallow permitted so long as the late Mr. Greg's health allowed his superintendence of the farm; but the bailiff now *occasionally fallows the field of the heaviest land:* this, however, is only resorted to when the land sown with turnips has not been prepared in time for the barley crop, and only averages about 16 acres a year out of 250."

Beatson's System.

Knowle Farm, in the neighborhood of Tunbridge Wells, which was a few years ago in the occupation of the late General Beatson, contains about 300 acres of land, of which 112 are arable, and is described as abounding with clay, and retentive of surface moisture, but when dried by the summer heat it becomes as hard as a brick, and impervious to the plough, unless with a great power of animal exertion, particularly as the general mode is to plough deep. The established rotation in that part of Kent and the neighboring portion of Sussex is fallow, wheat, and oats, with occasionally clover and rye grass; and the husbandry appears to have remained unaltered for ages, with the single exception of substituting lime for manure instead of marl. Upon this system the farm was managed during the general's absence while governor of the Island of St. Helena; and finding on his return, in the year 1813, "that he had no cause to boast of its profit, he re-

* It may, however, be observed, that at the period when Mr. Greg's account was published, wheat sold at 9s. the bushel, or 50 per cent. more than it does at the present period; whilst the cost of labor, including the increase of the poor's-rate, is scarcely reduced.

solved to trace the whole progress of the operations, from the commencement of the fallow to the close of the rotation;" the result of which was, that "having made a series of experiments to which he devoted his attention during five years, he determined upon *the total abolition of fallows.**

In order to effect this, he adopted several implements, chiefly of his own invention, for a description of which we must refer to his 'New System of Cultivation,' as we have only seen the scarifier in use. This is of a light construction, and certainly performs well; though, upon land such as that described by the general, it is worked by a pair of horses, and sometimes more, instead of one.

* * * * * * * *

He conceived that the grand source of all the heavy expenses of the old method might be traced to the fallow itself, and to the mode of preparing it —"by bringing up immense slags with the plough, by reversing the soil, and thus burying the seeds of weeds that had fallen on the surface, by which a foundation is laid for all the subsequent laborious and expensive operations." To avoid these, he therefore thought it necessary to proceed in a different manner—"to only break and crumble the surface soil to any depth that may be required; to burn and destroy the weeds; after which he would have the land in a fine and clean state of pulverization, and in readiness for receiving the seed, without losing a year's rent and taxes; and all this at a mere trifle of expense when compared with that which is incurred by a fallow."

In pursuance of this, he reduced the ploughing to a single operation at the depth of four inches. The chief use, indeed, which he made of the plough was to open furrows at twenty-seven inches apart, which was performed by a couple of horses at the rate of three acres per day, and was merely intended to prepare the land for the scarifiers, "which, by passing twice across these furrows, loosen all the stubble and roots of weeds, which are afterwards, with a small portion of the soil, placed in heaps and burned." By these means, together with the more frequent repetition of the horse-hoeing and the introduction of the row culture, the general assures us "that his lands were rendered much cleaner, and yielded better crops than they did formerly, after all the heavy expenses of lime and fallows."* He indeed states, that these operations produced the effect of pulverization to the depth of six or seven inches, and their expense was—

	s.	d.		
Five scarifyings, with a single-horse implement, at 1s. 8d. per acre	8	4		
Two harrowings, at 10½d. - -	1	9	s.	d.
			10	1

that the whole charge of cultivation, under a four-course system upon this plan, including rent, was—

	£.	s.	d.		
Tares, beans, peas, &c., per acre	5	0	0		
Wheat - - - "	5	0	0		
Oats and barley - "	3	13	6		
Clover and rye grass - "	2	15	0		
				16	8 6

thus only amounting to a trifle more than that of the fallow upon the former plan; that land cultivated upon his farm in this manner has yielded 460 sheaves of wheat per acre, whilst the average produce of the other fields did not exceed 360; and that *the difference in favor of the new method amounts, upon an average*—when wheat is at 10*s.* the bushel—to 350*l.* per annum upon the cultivation of 100 acres.

On the cultivation of these farms we have no observation to offer, except that they both merit attention. That belonging to Mr. Greg, although described as a tenacious clay, yet must be land of a superior quality, or it could not support the course of crops under which it has been cultivated; it has now, however, been continued under the same system for a number of years with distinguished success; and, without offering any opinion upon the plan, we conceive that similar experiments, upon a moderate scale, are fairly entitled to a trial. Regarding Knowle Farm, we have no information since the decease of its late proprietor; but the account which he was left, though inconsistent with the established practice of farming, and appearing, in some respects, not likely to be advantageously continued, yet contains hints which perhaps might be carried into effect without impropriety. Whether really deserving of imitation, or not, we at least do not consider ourselves entitled to withhold them from our readers, in a work professing to give an account of the practice of the United Kingdom.

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* His experiments were extended to various objects besides the working of the land; particularly to the combinations of different kinds of manure, and the burning of clay, (for which, see our vol. i, chaps. 16 and 17); but our present extracts only extend to the subject of fallowing, the charges of which he states to have amounted to 16*l.* per acre, thus:—

	£	s.	d.
Labor, breaking up the clover ley and three subsequent ploughings	£3	12	6
Eleven harrowings at ten acres per day - - - - - - -	0	9	0
Manure, one and a half wagon load of lime between the third and fourth ploughings - - - - - -	7	10	0
Carting and spreading ditto - -	0	6	0
Seed, two and a half bushels of wheat at 10*s.* - - - - - -	1	5	0
Sowing and rolling - - -	0	1	6
Rent and taxes for the year of fallow	1	10	0
Ditto for the year of crop - -	1	10	0
	£16	4	0

See his 'New System of Cultivation,' together with Supplement, containing plates of several machines invented by him; some of which will merit attention.

* On this subject he also observes, that "those who plough deep, and bury the seeds of weeds by the first ploughing, are not aware that, by this outset of their fallow, they lay the foundation of a great deal of labor and mischief, and bring upon themselves the absolute necessity of a fallow, as the only means of eradicating the progeny of those seeds which they have inadvertently deposited deep in the soil. Now, if the whole of the stubble and its roots, with a small portion of the surface soil *which must contain those seeds*, be collected and destroyed by fire, it is reasonable to suppose that the lands might be as effectually cleared of weeds in this manner, as by a summer fallow; besides they would have the benefit of a considerable portion of ashes. Perhaps, also, this mode of burning might have a tendency to prevent the disorders with which my crops have not been in the smallest degree affected."—2d edit. p. 90.

From the (London) Library of Useful Knowledge.

A GLOUCESTERSHIRE HILLFARM. COMMUNICATED BY MR. JOHN MORTON, CHESTERHILL.

Introductory Remarks.—On the formation and general character of soils.

Soil is formed by the mixture of decayed vegetables with the surface of the earth, and is clayey or sandy in proportion to the quantities of clay or sand with which the vegetable matter or mould is mixed. It differs from the subjacent soil or subsoil, according to the quantity of vegetable matter which it contains: but it partakes of the nature of the sub-soil. When the soil rests upon rock, it is supposed to have been gradually formed by the decomposition of the rock on which it rests. The nature of the soil will, therefore, partake of the nature of the rock. And whether the sub-soil is rock, gravel, sand or clay, the soil above it partakes of the same nature and properties in a greater or less degree. If the sub-soil is rock, the soil partakes of the nature and properties of that rock whether it is calcareous, silicious, or clayey. In like manner, if the sub-soil is a calcareous clay, a gravelly clay, or a sandy gravel, such is the soil; it is silicious, calcareous or clayey, as the sub-soil is. The nature of the sub-soil may, therefore, be easily known from the nature of the subjacent rock or sub-soil.*

The connexion that subsists between the soil and the subjacent rock or sub-soil is, in our opinion, of great importance, and would form the best foundation for a classification of soils, as conveying some idea of the nature and quality of the materials of which the soil is composed.

Sub-soil may either be of a compact, and retentive nature, preventing the rain or water that may come upon it from percolating through it,—such as clay, till, lias, limestone, and some other kinds of rock; or it may be of a loose, friable, and porous texture,—such as gravel, sand, and open rubbly rock. In the former case, it is easily affected by the alternations of dry and wet weather, and if near the surface, is of little value for the production of corn; in the latter, if also near the surface, the moisture of the soil is easily exhausted by heat and drought, and the plants *burn*, as it is called, or decay for want of nourishment.

A shallow soil is soon affected by the nature and texture of the sub-soil; and the greater its depth it is the less so, and, therefore, the better calculated for the purposes of cultivation.

Soils are, therefore, affected not only by their own depth, but also by the texture and quality of their sub-soils. The best sub-soil is that which is dry, friable, and porous.

General character of the oolitic formation.

The geology of the kingdom is now so well known, and the direction and boundary of each of the formations so well defined, that a selection of farms along the line of each of the several formations, would not only be the most scientific and comprehensive mode of proceeding with giving "a detailed view of the principal agricultural systems of England," but also by far the most useful to the practical agriculturist. Were accounts given of the different modes of culture practised on the different formations, and classed together according to the individual formations they describe, the student, in search of practical knowledge, would have the advantage of being enabled at once to refer to a variety of modes of management, pursued on the same sub-soil and nearly the same soil, and to select that which might seem the best adapted to his own particular case.

The principal feature of the county of Gloucester is the western boundary of the Cotswold hills, which is formed by the outer edge of the oolitic rock. In it there are a number of recesses, exhibiting a great variety of forms, and giving to the landscape of the county its peculiar character. These recesses opening into the great valley of the Severn, finely ramified, and extending a considerable way into the table-land, form deep, and beautiful valleys. These deep valleys, and the uniform inclination of the sides of the hills, give its beautiful and picturesque scenery to the county of Gloucester. These hills are very steep on the west side, but form a table-land or fall very gradually on the east. On this table land the Thames and the Isis take their rise, and wander eastward upwards of a hundred miles, before they reach the level of the tide; while in the west, the Severn, with its rapid tide, flows within about five miles of the edge of the hills, and, at the shortest distance, within fifteen miles of Thames' head. The Cotswold district is bounded on the west by the edge of the hills, and may be said to extend from near Bath to Moreton in the Marsh, varying in breadth from five to twenty miles. The sub-soil of this district being calcareous rubble, lying on the oolitic rock, (termed, provincially, Bath or freestone,) which is also calcareous, is open and dry, and readily permits the water to pass through it. The soil seems to be formed from the decomposition of the rock on which it lies, and partakes of its calcareous nature. It is loamy, shallow, and full of stones, seldom allowing the plough to enter more than four or five inches below the surface.

The eastern side of the Cotswold is composed of corn-brash, or forest-marble, which lies above the oolitic rock, and consists of beds of limestone, generally very thin, and divided by partings of calcareous clay, lying between strata of calcareo-silicious sandstone. Its beds are thin and slaty. Sometimes, however, beds two or three feet thick may be found. It is composed of dark-colored shells, interspersed with white oolitic particles. It is generally used as a coarse roofing slate, and as flagstone; but the more solid and thick beds are sometimes used as a coarse marble, being variegated by its imbedded shells.

The soil on the corn-brash or forest-marble is more tenacious in its nature, and generally of better quality than that on the oolitic or freestone. Thin wet clays, however, of the most worthless kind, are frequently to be met with on it, rotting sheep, if pastured on them, and seldom, if ever, repaying the expense of cultivation, if ploughed. Although the soil on the corn-brash contains a portion of silicious sand in its calcareous clay, it is of a binding and tenacious nature, clinging to the feet in wet, and baking into hard lumps in dry weather;

* An exception, however, must be made of alluvial soils, or such as have been conveyed from a distance, in the case of which the above correspondence between the soil and sub-soil does not hold—at least universally.

and in continued drought, the ground is rent open to the depth of the soil. This district, in most parts, is bleak and bare; but in others affords a short fine grass for pasture, and is generally well calculated for producing the crops which the arable farmer cultivates. The same formation with its soil and sub-soil extends from Crewkerne through the counties of Somerset, Gloucester, Oxford, Northampton, Rutland and Lincoln, to Barton on the Humber, with but very little variation in its nature and quality.

The general elevation of the Cotswold hills is from 500 to 800 feet: some of them rise to the height of 1100 feet. The climate is remarkably mild considering the elevation and nakedness of the district, there being very few hedges with hedge-row timber, the inclosures being chiefly formed by stone walls.

Tillage.

Tillage is an operation by which the soil is intended to be pulverized, to have a new surface exposed to the influence of the atmosphere, to be cleaned from weeds, and manured, and thus to be prepared for receiving the seeds of the plants cultivated by the husbandman. The land becomes foul and unproductive, when this operation is not properly performed. Tillage, therefore, holds a prominent place in the business of the arable farmer; and the character of the crops will depend on the manner in which it is executed.

The plough, the drag, the harrow, and the roller are the instruments universally employed by farmers in executing this work; which ought to be effected in spring and summer, when the ground is dry, when the influence of the sun and air will assist the farmer in accomplishing his object, and the earlier in spring it is accomplished the better. The principal object is to keep the land perfectly clean, that none of the virtue of the soil may go to the production of weeds; for if weeds are allowed to grow, all the labor, as well as the manure bestowed on the land will only tend to produce a greater quantity of them, and to reduce the land to a worse state than it was in before.

Land should never be ploughed in a wet state, for this not only gives encouragement to the growth of weeds, but also gives sourness and adhesiveness to the ground. Some soils will admit of being much wrought or pulverized by the plough, &c., in eradicating the weeds, and preparing them for the seed; while on others this would have the effect of nearly producing sterility, at least for one season. The intelligent farmer will adopt that mode of tillage which is best adapted to the peculiar nature of the soil he has to do with.

Cropping,

The course of cropping is regulated by various circumstances. The kind and quality of the soil, and its peculiar properties; the seasons, the most profitable application of manure; and the fact that no white or corn crop should be repeated in too rapid succession, are circumstances that always govern the prudent farmer in the adoption of a system. But the value of every rotation depends chiefly, if not entirely, on the quantity of food that is produced, during the course, for sheep and cattle, but particularly for sheep; and on its consumption on the farm, either in the fold or the stall. "No food, no cattle; no cattle, no dung; no dung, no corn," is a maxim that ought to be fixed in every farmer's mind. Turnips, vetches, clover, and saintfoin are indispensable in every good course, as winter, spring, and summer food; and the greater the crops of these are, the greater and more productive will be those of corn. These crops, of which the turnip crop is the principal, may, therefore, be considered as the foundation of all good husbandry.

In every system it is absolutely necessary to attend to the equal distribution of labor throughout the year; so that the work, which the system requires to be performed in each month, may be easily accomplished by the means you are provided with. The different operations should never be allowed to encroach on each other. If these are properly adjusted, the business of each week will be confined to the time in which it is required to be performed: regularity and economy in labor will be the consequences, followed by reciprocal improvement of soil and stock.

Description of the farm.

We have selected the farm of Beverstone, not only because there are most of the varieties of soil on it that are to be found on the whole range of the oolitic formation; but because we think that the mode adopted in the cultivation of this farm is well calculated for any farm on this formation; and because the diligence and economy which is practised in every department of the management are well worthy of the attention of every farmer in the kingdom.

Beverstone Farm, consisting of upwards of 1300 acres, is situated two miles west of Tetbury, Gloucestershire, on the Cotswold hills. The general aspect of the farm inclines to the south-east. It is all inclosed, and the fences, which consist principally of stone walls, are always in good order. The buildings, too, are kept in the best state of repair. A degree of neatness reigns over the whole farm; and, in every department of the establishment, order and regularity are maintained.

The system of farming, adopted by Mr. Jacob Hayward, the farmer, has grown out of the experience and observation of past years. It is not the offspring of fanciful theory; but of actual, continued, and successful practice for many years; and the result has been to the advantage both of tenant and landlord.

The following are the sorts of soil on this farm:—

1st. A thin wet clay, of a most adhesive nature, covering the thin fissile till-stone. Of this sort there are about 220 acres, the greater part of which is very worthless. The whole used to be under the plough; but has been laid down to grass—the greater part since 1820. It has proved so unsound for sheep, and so apt to rot them at certain seasons of the year, that they are seldom, if ever, permitted to enter upon it. It is, on this account, of little value, and is pastured by young beasts.

2d. A light stony soil, above the oolitic rock. In some places this soil is about four inches from the calcareous rubble; in others it is not more than two or three; but so irregular is its depth, and so variable its quality, that in a field of twenty acres, three or four acres of the same kind and quality are not to be found together. When the soil is deep, it is frequently of a dead or 'fainty' sandy nature, of very little value. The best sort of this stony soil is that in which the stones that are turned up with

the plough are of a darkish color; when they are whitish, the quality is very little worth.

3d. A soil, that has a good deal of clay in its composition, and of some depth, being neither too strong for turnips, nor too light and thin for beans. Of this, 57 acres are of natural grass, over which water can be partially thrown during the time of floods, and which are generally mown; 130 acres more are occasionally mown, and when not, they are pastured by cows and other stock. The remaining 40 acres, of this sort, are arable.

Of the whole farm about 400 acres are in pasture.

The farm-buildings are very inconveniently situated, the greater part of them, including the dwelling-house, being at the north side of the farm. There is a barn and a court near the south, and another barn and a court near the west side. But, from the extent of the farm, the greater part of the land is at a great distance from the buildings; so that, in carting either dung from the courts to the field, or corn from the field to the rick-yard, the average distance is about three-quarters of a mile. The whole of the wheat is always carted to the barn-yard nearest the house.

Tetbury is a market-town of some note; but very little dung can be got from it. One year, however, upwards of 300 cart loads were conveyed from it to this farm; but the expense of carting it and of collecting it in the town, together with the price paid for it, amounted to a sum, which the increase of produce from it did not cover; and after two or three years of trial the plan was given up. The only manure, therefore, which is used upon this farm, is what is made by the stock kept, by the cleanings of the ditches and road-sides mixed together, and by the feeding off of all the turnips on the ground by sheep. This last is found to be the most valuable manure for this sort of soil. Lime has been tried upon this land, but with little or no effect, owing, perhaps, to the soil being composed, principally, of calcareous matter.

[*Conclusion next month.*]

SPEECH OF DR. C. T. JACKSON.

Geological Surveyor of Maine, New Hampshire and Rhode Island, at the Second and Third Agricultural Meetings.

Dr. Jackson began by expressing the pleasure he had in these meetings for mutual information and improvement; and he augured the most beneficial results from the active spirit of inquiry which was now so generally awakened.

Agriculture is yet to derive immense advantages from scientific cultivation. The first element in agriculture is the soils, which constitute the seat of its operations. The soils which the earth presents, and which in different localities are found very differently constituted, although the same simple elements enter, to a certain extent, into the combination of all of them, are among the most important objects of inquiry and examination to the intelligent farmer.

Soils are, properly speaking, only the *detritus* or broken substance of decomposed rocks, intermixed in various degrees with organic matter in a state of dissolution and diffusion. The breaking down and the comminution of the rocks, so as to form the fine particles of the earth, have been the progressive results of the influence of air, moisture and frost, exerted through many ages which have passed and still in constant and active operation. That the earths were derived from the disintegration of rocks, he deemed conclusively established by the fact, that by the chemical and indeed microscopic examination of soils, they are found to consist of the same elements which enter into the formation of the rocks. In soils derived from granite were found quartz, feldspar, and mica; and the decomposition of slate rocks produces clay. The presence of limestones and porphyry serves in each case to produce a peculiar soil.

All the various mineral bases have an influence upon the character of a soil. Some of these minerals undergo a decomposition and enter directly into plants: silex, alumine, magnesia, all enter into plants; and silex, as is well known, forms the coat or skeleton of all graminaceous plants, or otherwise of plants belonging to the family of the grasses. These elements have much to do with the fertility of a soil.

The enriching mineral substance found in New Jersey, alluded to in a former discussion, is what is called a green sand, composed of silex, potash, and iron. It yields potash, and thus neutralizes any acid substances which may exist in the soils, to which it is applied.

Every observing traveller in passing through different countries, perceives that the soils of different countries possess properties peculiar to themselves. Thus limestone soils seem most congenial to the production of wheat; and granitic soils to that of grass. Each rock may be traced by its peculiar vegetation. The soils on the trap-rock formation in this state, are distinctly marked.

A great part of the state is of what is called the diluvial formation. In this case there is an evident removal of the earth's surface or soils by some violent convulsion in a sort of wave, from the north to the south. The proofs of this deluge in its advances south may be distinctly traced. Thus in a diluvial formation the soils will be found to be composed of the same elements as the rocks some miles distant to the northward of that place; and may be very different from the soil, which might be said to belong to the place, where they are found. As evidence of this movement south, the rocks in the vicinity of Providence are evidently formed from the disintegration of rocks of the graywacke formation some distance to the northward. The graywacke rocks are those composed of other rocks of various descriptions collected together in a miscellaneous combination, and cemented by a kind of argillaceous paste. In Maine there are abundant proofs that the whole soil of the country has, in many places, been removed southwardly. In Thomaston the soil is evidently of diluvial formation. Portland rests upon a formation of mica and talcose slate; but the soil is granitic and evidently transported from the vicinity of Brunswick.

The diluvial soils were transported by some extraordinary change in the earth's surface, produced, it may be, by a deluge or some similar catastrophe. Alluvial soils are formed from the washing of high places into those which are lower, by rains or freshets, and take place by a gradual deposit of earths or sands from water thus rendered turbid. The diluvial soils have a higher antiquity than the alluvial. The fertility of alluvial soils is owing, in a considerable measure, to the fine comminution of the particles of which they are composed. This allows the

roots of plants to spread themselves freely. There is much vegetable matter mixed up with them, though these soils are not remarkable for its abundance. Upon an examination of the alluvial soils of the Mississippi, the Ganges, and the Nile, they are found nearly to resemble each other, with the vegetable matter contained in them in a finely divided state.

The mixed elements of soils have a powerful action upon each other, and upon the plants which grow in them. Their earthy parts have an electro-motive power, which operates not only by the roots but by the leaves. A fertile soil consists of elements in a positive and a negative electric state, fairly balancing each other. If the soil is acid, it is barren; if alkaline, barren. The acid is in a negative, the alkaline in a positive electric state. Vegetable manures become acid or negative; animal manures positive or alkaline: they must be combined in order to produce the best result. When peats alone are used for manuring soils, the results are not always favorable. Farmers pronounce it a cold substance. In its natural state it abounds in acid properties and produces sorrel. We may render this substance one of the most valuable of manures by suitably preparing it, according to the experience of many farmers. Peat should be combined with some alkaline or basic substance, which will neutralize the acid which prevails in it, and then it will supply an abundant nutriment to vegetables. Peat is composed of mosses which grow and then continually decay, giving place constantly to succession of these sphaganeous plants, intermixed with leaves and decayed trees. They abound on the sea-board. Swamp mud resembles peat in proportion to the decayed vegetable matter which it contains; and is adapted to supply the manure we want.

Peat being dug out, another growth of it comes forward, and after a while its place is supplied again. On Block Island, where it abounds, it is used altogether for fuel. In this place the peat contains 98 per cent. of vegetable matter. Our peats contain from 80 to 97 parts of vegetable matter. Swamp mud consists of vegetable matter and earth, making a good manure when its acid properties are neutralized. Several farmers in the neighborhood of Boston have experienced its value. Peat can be substituted by proper management for manure. A distinguished farmer says that farming cannot be carried on in his location without peat. Two farmers within his knowledge have mixed three parts of peat with one of stable dung. By mixing it with lime and animal manure, ammoniacal gas is produced, which dissolves the peat and converts it into a powerful manure.

Lime is highly useful in its application to soils. In bone manure it is found in combination with phosphoric acid. The crenic and apocrenic acids unite with it and form manures. All manures before they act become converted into salts. Soils are in an acid or neutral state. Large tracts of country, which are now barren, by proper applications might be rendered fertile. A farm within his knowledge, which was a blowing sand, a pine barren, and almost hopeless, on which ten bushels of corn to an acre could scarcely be grown, by the judicious application of ashes, has been made to produce forty to fifty bushels to the acre.

The Dr. here illustrated his position by giving the chemical analysis of certain soils in Rhode Island, which it is understood will be presented to the public in his report in a detailed form. Methods should be taken to render the insoluble matter in soils soluble, that it may be taken up by the plants; and it is desirable that this process should proceed gradually. If acidities abound in the soil, correctives must be applied. It is easy to convert one quality of soil into another. The value of geological investigations is not properly estimated.—An analysis of soils is greatly wanted. The statistics of agriculture are greatly wanted. Farmers are not exact in their observation of their crops.—Many valuable agricultural districts are bottomed upon clay. This is desirable in order to preserve the manures which are applied to them. In soils where the manures applied pass through them by infiltration, much loss is sustained; and they are not favorable to agricultural products. This infiltration of manures is doubted by some, but the condition of our wells proves it. The water in a barn yard is never pure. As much as a teaspoonful of vegetable matter to a gallon is often obtained from waters which are considered pure. This may be seen by any one who will evaporate the Boston water to dryness. In the purest water obtained from lakes, 1½ grain of vegetable matter to the gallon may be obtained. In the water of Boston, 38 grains are found to the gallon. Soils brought from 150 feet depth in this neighborhood, are found charged with vegetable matter.

Land with a foot of top soil on a gravelly substratum may be unproductive. This is the case with the soil on Seekonk plains, which has a foot of soil containing 11 per cent. of vegetable matter; but manures applied pass through it by filtration; and it suffers from drought.

All our waters come from the top soil. Clay is a retainer of water. Bog iron ore is found in soils and is prejudicial to vegetation. There is a ready way for a farmer to test his water. By the application of a solution of lunar caustic to a glass of water, if it contains vegetable matter, it will become red. Distilled water will not exhibit this appearance.

Saline matters abound in soils in the form of carbonates, sulphates and phosphates. Lime is an important amendment to the soils by causing it to furnish nutriment to the plants. It is a chemical re-agent and decomposes manures and does not, as has been supposed, form insoluble matters. In the ashes of wheat, lime exists to the amount of 15 per cent. It is found in some proportion in all soils. The carbonate of lime is a valuable amendment to soils and especially to those which contain iron or copperas. Gypsum is a powerful stimulus to vegetation. Lime in the form of a carbonate is easily applied. The management of lime is too generally misunderstood. Fields perfectly barren have been rendered fertile by the use of it. There are few exceptions to this fact in Rhode Island. In some cases its application has been triumphantly successful, and in many cases of failure, the lime has been found to be highly magnesian. There are various matters connected with these subjects which will furnish excellent texts for discussion hereafter.—The action of manures is particularly important. Science here is of great importance. Certain acids in soils have been discovered by Berzelius. The crenic and apocrenic acids. These are found in the soils of both hemispheres; in the soils of the Mississippi and the Nile. These soils closely re-

semble each other. The soil of the Nile contains 2.8 per cent. of the carbonate and phosphate of lime. The soil of the Mississippi has less iron and more clay.

The introduction of science into agriculture has been of great benefit. How soils are to be rendered fertile or how corrected, have hitherto been matters of empiricism. We should desire to act understandingly, not ignorantly.

The changes which take place in the progress of the growth of plants are remarkable. In the germination of the seed, carbonic acid is given out, and oxygen absorbed. After the leaves are formed, they absorb carbonic acid and give out oxygen. When the plant ripens, they give out carbonic acid and absorb oxygen. All manures act on the foliage. If plants are overstrained they fail to produce fruit. It is important to find the proper point or limit of manuring. A distinguished gardener engaged to produce a geranium leaf as large as a cabbage: it was effected, but the plant perished in the effort.

Bleaching powders or chloride of lime, are a powerful manure, and produce astonishing effects on vegetation. The ammoniacal gas or sal volatile operates powerfully upon plants, and this matter is produced by the fermentation of barn manures.

In soils which are porous, it is advisable to use manures in a long state. The manures which are obtainable are different in different places. Experiments have been made with bone manure, lime, and ashes, and, as reported, with different results. There are, undoubtedly, differences in soils, which affect their operation. These subjects deserve inquiry and observation. Agricultural observations should be made exact and certain. As the pursuit becomes intelligent it rises in dignity. Why should farmers be ignorant of their great art, when it is the aim and boast of every other profession and pursuit, to study their art thoroughly? Agriculture may be rendered scientific; and science well applied must conduce to render it more profitable.

Facts in these matters are of the highest importance. In Maine ashes were thrown away. The Long Island farmers are willing to send to Massachusetts to obtain them. The intrinsic value or efficiency of the material cannot be affected by the different estimation in which they are held. Peat we see in some places is highly esteemed as a manure. In many places it is utterly neglected; and this can arise only from ignorance of its value or of the proper mode of applying it.

Facts, be repeated, are of the highest importance. Peat in a crude state, is not suited for application to the land. It must be decomposed, and its acidities corrected. A farmer in Rhode Island has made much use of swamp mud compounded with fish, the Menhaden, which are taken in their bays in great abundance. To eight cart loads of swamp mud or peat, he applied one barrel of fish. This compost is denominated fish-pie. The rotting of the fish decomposed the peat and the peat absorbed the ammoniacal gases, which escaped from the decayed fish. The farmer deemed this mixture of equal value with the best of unmixed barn manure. On a level field, planted with corn at right angles, every row manured with this compost was distinctly observable, and was eight times as large as that part dressed with hog manure. At the harvest the crop from the rows manured with this compost gave an increase over the other parts of the field of fifty per cent. Any decaying animal substance, on being mixed with it, will produce a decomposition of peat.

The physiology of vegetation is a subject deserving of much attention. The mode in which plants receive their nutriment from the soil is not, as has been supposed, by capillary attraction, but the vegetable food in a liquid form is forced into the minute vessels of the plants by an electric or voltaic agency. This is the discovery of a Frenchman by the name of Detrochet, and is called by him *endosmose*. [Dr. Jackson here illustrated this matter by a small apparatus.] This operation is at once suspended by the presence of certain substances, such as sulphuretted hydrogen or one drop of fœcal matter in the vessel. Acids and alkalies in their combination act as galvanic batteries, and forward the process of vegetation.

The physiology of plants should be studied by the farmer. Innumerable, curious and wonderful operations are continually going on before him. No situation is more favorable than his to intellectual and moral improvement; and no employment more interesting than the contemplation of the phenomena of the natural world.

The green sand spoken of is as difficult of solution as the feldspar in granite. In Sweden the carbonate of potash is used to decompose the nitrate of lime, which is formed in their artificial nitre beds, which are similar to compost heaps.—Nitre is produced abundantly in our dung heaps. Many other salts are produced by chemical changes, which are continually going on in the earth and air. The putrefaction of animal and vegetable substances is productive of various changes, and of substance useful in vegetation. The crenic and apocrenic acids are always found in soils, and the degree of their presence when ascertained, will indicate the applications to be made to the land.

The skeletons of all plants and animals have lime for their bases. Silex gets into plants in a manner altogether mysterious. It is found in all plants with hollow stems, such as many of the grasses, in wheat and the cereal grains, in bamboo and flags. The crenic and apocrenic acids operate to dissolve silex. The absorption of plants is not wholly by their roots, but by their leaves, which are the lungs of plants and gather the carbonic acid gas from the air, and its carbon is converted into solid wood. Nature pursues her operation in one eternal round, and all things combine mutually to assist and modify each other. Plants are highly beneficial to life and health, in absorbing and decomposing the elements of the air, and returning that portion which is necessary to respiration and life.

Agriculture is yet to make great advances in this country. The value of peat lands is very imperfectly understood. A farmer in the vicinity of Boston, distinguished for his scientific and practical skill, has obtained one hundred bushels of corn to the acre upon redeemed peat meadows; and obtains from these lands an income of ten to twelve per cent. profit. Land might be cultivated with much more skill and to much higher profit in proportion to the skill applied. Liquid manures among us are almost entirely wasted. Night soil is often thrown away, and yet it is one of the most efficient of manures. With all our advantages, we bring

Indian corn from Africa, and the country of the Nile furnishes us with peas and beans.

The population of China is immense and supported wholly from the soil. The allowance for a China man is indeed small, as three dollars per year will serve to keep soul and body together; but even to earn this, every person does and must work. Among this people agriculture is carried to an extraordinary degree of perfection. With us too large a portion of our people are devoted to trade; and the pursuits of rural industry are deserted for the hazards of speculation and commercial life. As we cross our breeds of cattle that we may improve our stock, it would be fortunate if we could so cross our farmers and merchants that the habits of exactness in keeping accounts and the enterprise and spirit of progress, which distinguish the mercantile classes, could be in some measure transferred or infused into our farmers.

Great advantages seem to result from the mere mechanical mixture of soils, as for example, of sand with clay, or clay with sand. This seems to affect their electro-motive power and induces absorption in the plant. Besides the combined acids which exist in soils, there is often much free acid which requires to be taken up or neutralized. There is much siliceous matter in all soils. The oxides of different minerals abound in soils. These have different electric powers, which require to be understood and regarded. Many soils which have been thought to contain no vegetable matter, have been found upon examination to contain eighty-six tons of vegetable matter to an acre. Fields of barren sand have been rendered productive by the application of alkaline substances. These soils have been ashed, and portions of vegetable matter have been removed by two successive crops. In some soils there is a large amount of vegetable matter in an insoluble state. In this case it must by some application be rendered soluble, and this can easily be done.

The geological formation of soils is of much importance. A soil with a loose substratum must lose much by infiltration.* The farmer will find great advantages from the chemical analysis of his soils. A gross analysis will not show the differences which exist. It must be conducted with a refinement of skill and care. The influence of half a bushel of gypsum spread upon an acre of land has been known to render it fertile. It seemed a mere drop in the bucket, yet it produced a surprising difference in the crop. Gypsum has not the same effect on all soils. If the soil abounds in the ingredients which are applied, they are thrown away. If a soil, for example, contains 1.5 per cent. of phosphate of lime, it does not require the application of bone manure. So of lime where lime abounds.—The soil of the banks of the Nile, probably the most fertile in the world, contain only 2.8 per cent. of lime. The saline manures, such as carbonates, sulphates, phosphates, &c. are absorbed by the plants. They act as stimuli to vegetation; and change the soil so as to render it fertile. Saline manures do not act always in the same way. They act principally on the foliage. They excite action in the plant, and carbonic acid gas is absorbed. The decomposition of vegetable substances gives out carbonic acid gas, which is immediately seized upon by the plants. Large amounts of ammoniacal gas are obtained from the putrefaction of animal substances. This is a valuable manure. The carbonate of ammonia, to obtain it pure from the shops, would be too expensive for a manure. We must make it in our dung heaps.

The nature of manures is just beginning to be understood. The attention paid to it, when science was imperfect, led to few valuable results.—Two new acids were discovered by Berzelius in 1833—the crenic and apocrenic. They were discovered in the Forlar well in Sweden. They are found in all soils. They are among the constituents of peat. They are probably universal. These acids must be neutralized.

The opinions of farmers are often only blind prejudices, though there are bright and honorable exceptions to this remark. Facts which are universally admitted must have a foundation. These acids are found in humus or geine—are found also in our waters—in all soils—sometimes in union with bases—sometimes in a free state. In respect to these scientific investigations, we have as yet only skimmed the surface. More, however, has been effected within the last three years than ever before since the history of man.

Geological and agricultural surveys are creditable to the state. The facts which they collect and embody, may be rendered of the highest service.—A state geologist might be fully occupied in the analysis of soils. Agriculture, thus made the subject of scientific inquiry, would cease to be a drudgery and attain its proper rank among the first employments of man. Agricultural books are many of them full of absurdities, because the nature of the elements of which they treat is so little understood. Many have heard of the experiment of the man who shut up a hen and fed her exclusively upon wheat. It was a matter of insoluble mystery how, under such circumstances, she could obtain lime enough to form the shells of the eggs which she laid, which in truth contained a weight of lime greater than the weight of her body. It was not known that the wheat itself on which she was fed, furnished the lime which she required. Chemistry shows that lime enters into the composition of wheat.

Every farmer has not a taste for science; but some have, and this taste should be cultivated and encouraged. Subjects connected with agriculture are well adapted for country lyceums. Here facts would be obtained from practical and observing minds. The action of manures should particularly invite attention. Experiments in cultivation should be made on soils whose composition is known; and products should be exactly noted and compared with each other.

De Candolle, a distinguished Swiss philosopher, who has given particular attention to vegetable physiology, has treated of the action of poisons upon plants. There are substances which are poi-

* The Dr. here gave another pointed reference to the impure state of the well water of Boston, which was felt like an electric shock in the abdominal muscles of the representatives from the country; (the Boston gentlemen are too far gone in this matter to feel at all,) and made them think at once of resigning their seats or removing the seat of government. There are salts of lime enough in the water of Boston wells drank every year, to make ten statues as large as Lot's wife! and as to the other impurities which exist in it, according to the Dr.'s account, they are not to be named. No apothecary's mixture surpasses it; and we know of nothing for which it is suited but for whisky or brandy punch!

sonous to plants as there are those which are destructive of animal life. *Nux vomica* and some other substances poisonous to animals, are poisonous to plants. Substances which taken into the stomach of a man may be serviceable to health, if received into his lungs might be fatal. So substances which if applied to the roots of plants might prove destructive, if imbibed in a gaseous form by the leaves, may stimulate and advance their growth. In simple carbonic acid gas, plants would die; but received in quantities larger than exists in our atmosphere, it proves favorable to them. Carbonic acid gas, which in certain quantities is nutritious to plants, is destructive to animal life.

The quantity of vegetable matter in soils and other different substances, presents a curious inquiry. Silex is the same as rock crystal, obtained after solution. Alumine is the same as clay; but clay is not found pure, and usually contains more than fifty per cent. of silex. Oxides of iron, manganese and lime are found. Lime is usually found in the form of a carbonate. Peroxide of iron, iron rust, is found. Silex, alumine, lime and iron, combined in various proportions, constitute soils. Vegetable matter, containing the crenic and apocrenic acids is found. Geine is not a simple proximate principle but contains these two acids. [The Dr. illustrated this matter by an exhibition of the crenate and apocrenate of copper, obtained from geine.]

The analysis of a clay soil in this vicinity is as follows:

Water,	2.
Vegetable matter,	3.5
Silex and alumine,	74.
Carbonate of lime,	5.
Oxide of iron,	15.
Loss,	.5
	100.

Of another is as follows:

Dark clay:	
Water,	8.
Vegetable matter,	14.
Silex and alumine,	72.6
Carbonate of lime,	5.4
	100.

To give some idea of the quantity of vegetable matter contained in an acre of ground, we may make the following calculations:

Example of calculation of the weight of a soil and of its manure.

Let the specific gravity of a soil be 1 277—water being 1.—then one cubic foot of water weighing 1000 ounces, a cubic foot of the soil would weigh 1277 ounces or 79.187 lbs.

An acre of land contains 43.560 square feet area, and if we estimate the cubic foot of soil as weighing 79.186 lbs. or half a cubic foot at 39½ lbs. nearly, supposing we wish to calculate the weight of an acre of the soil for the depth of six inches, (the usual depth of tillage,) we have the following sum: $43{,}560 \times 39\frac{1}{2} = 1{,}719{,}620$ lbs., or 859 tons nearly, as the weight of an acre of this soil to the depth of half a foot.

If then the soil contain 9½ per cent. of vegetable matter, 3.2 per cent. being soluble, and 6.3 insoluble—$859 \times 9\frac{1}{2} \div 100 = 81\frac{1}{2}$ tons of vegetable matter to one acre within 6 inches depth. Of this 27½ tons is soluble, and 54 tons insoluble.

This example is taken from an actual analysis of a soil in the vicinity of Boston. The principles laid down will suffice for the estimation of each and every article found in given soils by chemical researches, and the quantity of manure or of any fertilizer may be easily learned.

Some acres of land upon examination, have been found to contain 91 tons of vegetable matter—some 96 tons—22 of soluble and 72 of insoluble. Excluding stones, we may consider that there are 800 tons of soil to an acre 6 inches deep. In an acre of land, by a calculation of this kind, containing 6.8 of phosphate of lime, bone manure would have no effect.

The peat on the farm of E. Phinney, Esq., used both for fuel and manure, contains 96 per cent. of vegetable matter. The ashes of this peat contains silex, alumine, phosphate of lime, oxide of manganese and oxide of iron.

The carbonate of lime, of potash and of soda, acts upon it. The carbonate of ammonia is taken up by it. Lime neutralizes its acid. Peat bogs are composed of sphaganeous mosses; and on Block Island they are said to renew themselves, after being dug over, in forty years, if the surface paring is returned to the pit when they are dug.

Besides decayed mosses, decayed trees and leaves collect in these swamps and compose a part of the deposit. Peat is of immense value, and not well appreciated by farmers. Experiments of its application in a natural state have proved failures. The farmers on Block Island would not use it. A farmer in Waterford, Me. applied it in a crude state, and his corn was dwarfish and appeared as though struck with the yellow fever. When its acid properties are neutralized, it becomes as valuable as horse dung. Peat bogs must be drained. Covered drains properly constructed, are as effectual as open drains. Peat bogs are remarkable for retaining moisture. Wetness is absorbed by the peat by capillary attraction.

Dr. Jackson stated that he had fully described Mr. Phinney's method of management, in his third report on the geology of Maine. His meadows are drained. They are then ploughed or the sward inverted; and then dressed with a compost of animal manure, mud and lime prepared in his hog pens, where the hogs earn much of their living by their labor.

On land thus prepared, he has obtained 75 bushels of corn to the acre, and from 4½ to 5 tons of hay per acre. The last season he got a crop of corn of from 80 to 100 bushels per acre. After such land is well drained, he can work upon it with his cattle. He refuses to sell this peat upon this land even at 500 dollars per acre. Being well supplied with peat mud, each hog will make ten loads of manure in the course of the year. This is then thrown out and freely limed. After three weeks' preparation by lime, this compost may be applied to the land, at the rate of twenty loads to an acre. About one-third of stable manure is deemed the proper proportion to apply to the compost. In the opinion of Mr. Phinney and Mr. Haggerston, three loads of muck and one load of stable dung are equal to four loads of stable manure.

It is a singular fact, that in England peat was formerly considered as a useless substance. One great use of peat consists in its power of absorbing liquid manures. In barn-yards it absorbs the urine. The liquid manure of an animal is considered by many judicious farmers, where it can be well saved and applied, as of equal value as the solid. This subject deserves much attention.

REPORT FROM THE COMMISSIONER OF PATENTS, SHOWING THE OPERATIONS OF HIS OFFICE DURING THE YEAR 1839.

JANUARY 24, 1840.---Referred to the Committee on Patents and the Patent Office, and ordered to be printed.

Patent Office, January 1, 1840.

SIR—The Commissioner of Patents has the honor to transmit his annual report.

Four hundred and twenty-five patents have been issued during 1839, (including eight additional improvements to former patents,) of which classified and alphabetical lists are annexed, marked A and B.

During the same period, three hundred and three patents have been expired, as per list marked C.

The receipts of office for 1839 amount to $37,-260, from which may be deducted $5,769, paid on applications withdrawn.

The ordinary expenses of the Patent Office the past year, including payments for the library and agricultural statistics, were $20,799 95, leaving a surplus of $11,450 43 to be credited to the patent fund, as per statement marked E.

For the restoration of models, records, and drawings, under the act of 3d March, 1837, $7,973 57 have been expended, as per statement marked F.

The receipts of the office would have been nearly $2,000 more, had not the late law permitted assignments to be recorded without charge, a gratuity, however, which has given much satisfaction.

In compliance with the act of 3d of March, 1839, I have published a digest of all patents granted by the United States, adding thereto an alphabetical index, and shall deposite in the library of congress nine hundred copies of the same.

The old digest was very defective. A new arrangement has been made, giving to each invention its appropriate classification.

A distribution of the new digest, will materially lessen the correspondence of the office, and guard citizens against the impositions of venders of spurious patents. The volume contains above seven hundred and fifty pages.

The work was deemed necessary for daily reference in the office, and, believing the appropriation adequate to cover the expenses, I did not delay the publication.

A small additional appropriation from the patent fund will be required to complete payment for the same.

Eleven thousand five hundred and nine patents have been issued by the United States previous to January, 1840.

A large number of applications partially completed are awaiting the reception of models and treasury fee.

The transmission of models through agents appointed by law in the several states affords much facility to inventors; and if permission were given to deposite with collectors of public revenue the fees required, such accommodations would obviate one cause of perplexity and delay, and be more especially convenient in consequence of their present agency in forwarding such models.

I am happy to say the patent office building is so far completed as to afford, within a few weeks, the necessary accommodation for the office, and to enable the commissioner to receive the numerous specimens of American art as contemplated by the act of reorganization, and to carry out the wishes of congress by collecting and distributing valuable seeds; exhibiting, also, under appropriate classifications, the most important varieties, both exotic and indigenous.

The inquiries propounded by the honorable secretary of state, in taking the next census, rendered it necessary for the commissioner to expend but a small part of the appropriation for procuring agricultural statistics. From data of so high a source, the commissioner can safely predicate future calculations, and hopes to present to congress such details of domestic products as will be of importance in financial estimates.

The diplomatic corps of the United States residing abroad, have been solicited to aid in procuring valuable seeds, and the officers of the navy, with the approbation of the honorable secretary of that department, have been requested to convey to the patent office, for distribution, such seeds as may be offered. In many cases, no charges will be made for seeds. If small expenses do arise, they can be reimbursed by appropriations from the patent fund, daily accumulating, and consecrated specially to the promotion of the arts and sciences.

The cheerfulness with which the diplomatic corps and the officers of the navy have received the request of this office, justify sanguine anticipations from this new undertaking.

With the additional assistance granted last session, and correspondent exertions on the part of those connected with the bureau, the business in each branch is brought up. Less delay will, I trust, arise in future applications.

The number of caveats issued in 1839 was two hundred and twenty-five.

The number of applications for patents the same year exceeds eight hundred. One-half of these have been rejected on examination. That the investigations of the office have not been conducted without care and attention, may perhaps be inferred from the fact that no appeal has been taken from the decision of the commissioner on these cases. These rejections will show patentees, that they are protected from interference, to a great extent, and the public generally, how much they are guarded against useless or invalid patents.

I only add that a small appropriation will be required to continue present periodicals taken at the office, together with some additional standard works which are needed for daily reference.

Very respectfully,
Your obedient servant,
HENRY L. ELLSWORTH.

HON. R. M. JOHNSON,
President of the Senate of the United States.

LETTERS PATENT GRANTED DURING THE YEAR 1839, FOR INVENTIONS OF MACHINES, &c., FOR AGRICULTURAL PURPOSES.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	WHEN ISSUED.
Bee-hives	Samuel C. Myers	Mount Pleasant, Pa.	July 22
Bee-hives	John Sholl	New York	November 29
Bee-hives	William M. Hall	Wallingford, Ct.	December 27
Binding grain	Israel Keyes	Putney, Vt.	July 17
Churn	Milo B. Hough	Dover, Ohio	January 21
Churn	John S. Thomson	Wyalusing, Pa.	July 27
Corn sheller	Alonzo R. Dinsmore	West Chester, N. H.	February 28
Corn sheller	Wm. McIlroy Bartley and Wm. Boon	Greenwich, N. J.	March 30
Corn sheller	William R. Parker	Milton, Del.	July 9
Corn sheller	Lester E. Denison	Saybrook, Ct.	August 12
Corn sheller	Samuel H. Kisinger and E. G. W. Stake	Williamsport, Md.	October 31
Corn sheller and hulling grain	John Mercer	Harrisville, Ohio	June 24
Cultivator, corn	John B. Smith	Norfolk, Va.	April 15
Cultivator, garden	John B. Smith	Norfolk, Va.	April 10; antedated Oct. 10, 1838
Cutting, attaching scythes to snaths	Ebenezer G. Lamson	Shelburne, Mass.	July 2
Harrows, revolving	Moses G. Cass	Utica, N. Y.	September 10
Hulling clover seeds and other grass seed	Abraham Keagy	Morrison's Cove, Pa.	June 24
Mowing machines	Asa B. Trask and Davis Aldrich	Ellington, N. Y.	October 16
Plough	William Small	North Argyle, N. Y.	April 22
Plough	Ebenezer G. Whiting	Racine, Wisconsin, T.	July 11
Plough	Ambrose Barnaby	Ithaca, N. Y.	September 11
Plough	Josiah Dutcher	New York, N. Y.	October 9
Plough, coupling, &c.	Joseph Card and Grandison Newell	Mentor, Ohio	November 9
Plough, hill-side and horizontal	John M. Jordan	Lexington, Va.	April 19
Plough, mould-boards of	Samuel Witherow and David Pierce	Philadelphia, Pa.	October 5
Rake	Hezekiah Haynes	Middletown, Vt.	June 18
Rake, hay and grain harrow	George Davis	Belmont, Ohio	July 22
Rake, hay revolving	Ephraim B. and Moses D. Wells	Morgantown, Va.	September 20
Seeding, planting corn	Niram R. and Orin G. Merchant	Guildford, N. Y.	October 12
Seeding, planting corn and other seeds	David S. Rockwell	New Canaan, C.	March 12
Seeding, planting machines	Moses Atwood, jr.	Hampstead, N. H.	June 24
Seeding, planting machines	John M. Forest	Princess Ann C. H., Va.	June 25
Seeding, sowing grain, plaster, &c.	Samuel Hoffer	Londonderry Pa.	July 17
Seeding, sowing seed	Martin and Samuel Lee Seward	Guildford, Ct.	July 27
Smut machine, &c.	William C. Grimes	York, Pa.	March 25
Smut machine	John B. Yates	Sperryville, Va.	October 12
Smut machine	Leonard Smith	Plattsburg, N. Y.	October 18
Smut machine	Luther B. Walker	Orangeville, N. Y.	October 18
Smut machine	Samuel W. Foster	Scio, Mich.	December 21
Smut machine, cleaning grain	George Mann, jr.	Lockport, N. Y.	June 29
Smut machine, cleaning grain	Thomas McCrea	Ann Arundel, Va.	August 9
Smut machine, cleaning wheat	Elisha W. and William B. Young	Parkman, Ohio	July 2
Straw cutter	Willis Grantham	Marshall's Ferry, Tenn.	June 18
Straw cutter	William A. Staples	Lynchburg, Va.	November 16
Straw cutting	Charles T. Botts	Richmond, Va.	March 15
Straw cutting, &c.	Thomas Hopper	New Brunswick, N. J.	March 15
Thrashing and cleaning grain	Matthew McKeever	Staunton, Va.	March 15
Thrashing, shelling, and hulling grain	Thomas Elliott, jr.	Middletown, Ky.	March 26
Thrashing machine, teeth for	Jeremiah Wrightson	Tobacco Stick, Md.	May 17
Winnowing machine, fanning mills	Alfred Ervin	Jefferson, Md.	September 30
Winnowing, separating wild peas, &c., from grain, reissue	Lester Butler	Cobleskill, N. Y.	Patented June 3, 1837, and reissued March 8

BEET SUGAR--AGAIN.

From the Journal of Commerce.

Good reader, did you ever see any beet sugar? did you ever taste it? We have; and must say that handsomer or better flavored brown sugar we never met with. The grain is very fine,—finer than is usual even with cane sugar,—while the flavor is like that of maple, free from the least tinge of nausea, and sweeter to the taste than the purest loaf. If such sugar can be produced at the same price as cane or maple, it will have a great run. We conceive that Mr. Child (to whose book we alluded in our former remarks) is rendering an important service to the American public, and we hope to himself also, by bringing the question to a practical test. He manufactured, (so far as we know,) the first beet sugar ever produced in America. For this, he has within a few weeks received a premium of $100 from the Massachusetts Agricultural Society, it being the same article to which previously a medal was awarded at the great Boston Mechanics' Fair in the autumn. About 300 lbs. were made in 1838, much of which was good, but a still better article was produced the next year. An improvement in the drying apparatus, by which the access of smoke was prevented,—and better acquaintance with the management of it, by which fermentation on the one hand, and carbonization on the other, were avoided, gave a nearly unexceptionable material; the liquor was light colored and transparent; the proportion of lime required, less; the defecations more prompt and complete, and the concentrations almost without scums; in short, the sugar graining in a few hours, drained well, "*and is not inferior in flavor or appearance to the finest West India Muscovadoes.*" Mr. C. adds in this connexion, "the quality of the molasses has been a matter of surprise to us. In France, the molasses is considered of no value except for feeding animals, or for distilling; and it sells for 4 or 5 cts. a gallon. The molasses from the sugar in question is of a bright amber color, and so pure and pleasant, as as to be preferred by many to any but sugar-bakers'." Mr. Child considers the following points to be well ascertained by his experience thus far:

1. That all the saccharine contained in the beet can be extracted by the method of desiccation.

2. That the raw sugar can be obtained without any bad taste, and fit for immediate consumption.

3. That American beets, though generally inferior to the European in saccharine richness, can by suitable culture be made inferior to none.

4. That 50 per cent. more of crystallizable sugar can be obtained by the method of desiccation, than has generally been obtained by grating and pressing or macerating the green beet.

5. That the beet, once dried, may be kept an indefinite time without liability to injury.

This method of desiccation, the invention of Schuzenback, is the one practised at Northampton. Mr. C. observes that a method has been patented by Mr. Herd of Stoncham, near Boston, of drying the beet by a *cold* blast; in other words, by freezing it dry. This he calls an ingenious conception, but is not convinced that it can be made available as a method of manufacture. In his own experience Mr. C. has endeavored to carry out the principle of desiccation, by machinery of his own; Schuzenback having been unwilling, it seems, to impart any information, unless the privilege of using his invention in the whole United States were previously purchased, and security given for the payment, in case the truth of his pretensions should be demonstrated by the result of a model factory. It is proper to add, that some experiments have lately been made on beets dried by steam, and that the result is stated to be a "white sugar, obtained at once, fully equal to the clayed sugars of Havana." Some of our northern friends who have examined the article confirm this statement of Mr. C. The same method will be practised extensively hereafter, we presume--perhaps altogether. We understand that the company for which Mr. C. is engaged have purchased a large establishment in the vicinity of Northampton village, recently set up with a view to the (exploded) silk manufacturing, and that their intention is to make about 300,000 lbs. of sugar the coming season. This will suffice to give Mr. Child's notions and the whole business a tolerably fair trial. At present, though many points are settled, others, by his own showing, (and he is very frank and fair about it,) are not so. The thing may be practicable, for example, without being profitable. This is with us Americans the chief consideration, as it is very apt to be in all similar cases.

In regard to the success of the culture, we are told that in the department of the north, in France, the average produce of an acre is 15 tons (600 lbs.) This is the highest in that country. In the two adjoining departments (Aisne and Pas de Calais), it is 12 and 11. As we recede from old Flanders, the head quarters of the beet sugar industry and of French husbandry, the rate declines to 10 tons. The general average is 13. In Germany the average is 15. At Northampton the best fields have yielded 15, but they were not trimmed closely or the gross weight would have been reduced 10 to 20 per cent.; so that the merchantable produce would have been 13 tons to the acre. It is proper to observe that far larger crops than any here mentioned are often had in France, and they probably show what might be done more generally. Thirty tons an acre, Mr. Child says, are not uncommon, and 45 have been produced. In England they considerably exceed this. He is informed by *Mr. Kyan*, the inventor of the anti-dry-rot process, and interested in an establishment for the manufacture of paper, brandy, and vinegar from beets, that there the *average* crop is 30 tons per acre, and the maximum 50; being, at 58 lbs. to the bushel, no less than 1931 bushels; and capable, *if as rich* as the beets of France, of making 8960 lbs. of brown sugar. It appears that *our* beets, with slight exceptions, have not attained a degree of saccharine richness equal to that of the French. Instead of 10 to 10½ per cent. of sugar, they have contained but 7½ to 9 per. cent. Mr. C. attributes it to the inexperience of cultivators, and mainly to improper measures. This is considered a matter of great importance. Animal ordures do very well, but it is said, the most stimulating and at the same time innocent manures for the beet, are *the refuse of the sugar-house*, scums and sediment from the pans, and animal charcoal, or bone-black in powder, which has been used in clarifying, and which powder is mingled with earth. Mr. C. observes that this article was unknown until 1822. Pre-

viously many millions of pounds had been annually thrown into the public discharges. It had been used for a number of years, as it still is, for clarifying juice, liquor, and syrups, in the manufacture and refining of sugar. In that year *Payen*, a distinguished refiner, at Paris, suggested the idea of its value as manure. Experiments were immediately made, with striking results. At first it sold for about 16 cents a bushel, but soon rose to three times as much. It is now manufactured at a large establishment near Paris, expressly for manure.

On this general subject Mr. Child says, we think pretty truly, that the fertility of our country has been declining ever since its settlement. "We speak of the country at large, and it is no answer to any that there are farms equal or superior to the maiden soil, which our fathers found. Probably a century with the best system of agriculture, and the best disposition to execute it, could scarcely restore an amount of fertility equal to that which has been dissipated. This is not good husbandry, it is barbarous waste. Good husbandry increases or keeps up the fertility of the soil. The truth is that we have generally sought to get from our lands the most that we possibly could, in the shortest possible time. In this, as in other things, haste makes waste. We kill the goose that lays the golden eggs.

In regard to its effect on the soil, it would seem that much may be said for the beet. Mr. C. observes, as to corn and broom-corn, that neither of these is an *enriching* or a *cleaning* crop. The beet is both, exterminating every noxious plant and leaving green stuff on the ground, which ploughed in is equal to a quarter or half manuring, i. e. to 5 or 10 loads of manure per acre, and the expense of carting it. The addition which the beets, worked up in a sugary, make to the stock of manure, is another item of moment, and much stress is laid on the value of the *pulp*, (left after pression.) This usually contains more saccharine matter in proportion to its weight than the original material. An ox consumes 60 to 75 lbs. of dry pulp per day; a sheep 4 to 5 lbs. A factory working up 25,000 lbs. of beets per day, will feed 70 oxen, or 1000 sheep; or 50 oxen and 300 sheep; or 30 oxen and 600 sheep. Wheat straw is usually given with the pulp, and toward the close of the fattening, oil-cake or meal is added. Three months suffice for fattening a bullock, and two for a sheep. The amount of it is, that a vast quantity of manure is made on a beet-sugar farm. It is usually estimated at *four times the ordinary quantity;* and its quality, being that of sheep, hogs, and horned cattle, is of course excellent.

All these are profits to be considered in calculating the pecuniary practicability of the business among ourselves.

According to Mr. Child, the actual cost of the sugar made by him, when the material was good was 11 cents per pound; the pulp and manure not being taken into the account. Mr. C. thinks that with proper and sufficient means, beet sugar may be manufactured in the United States for *four cents per pound*; and that when the manufacture shall have become domesticated amongst us, it will probably be produced at a cost less than that. In France the great advances made are certainly encouraging. According to the earliest accounts, the pound of raw sugar costs 16 cents. Drapier of Lille, in 1811, made the refined beet sugar at 35 cents, and Dombaole, two or three years afterwards, at 30 cents. Count Chaptal, in 1822, stated the cost of the raw sugar in his factory at 11 cents. In the same year, the Duke of Ragusa made it at 9½ cents, and Crespel at 6½ which, in 1825, he had further reduced to 5½. Two years ago, Crespel in giving evidence before a committee of the Chamber of Deputies, on the beet sugar excise bill, stated the cost of his sugar at five cents, one mill. Mr. Child says he has compared the results of twenty-nine French factories, and found the cost of their sugar 6 cents 6 mills, to which however must be added, he observes, the green leaves for feeding a large stock of cattle and sheep two or three months or the same leaves left on the field and ploughed in; the manure, which is quadrupled in quantity and improved in quality on a farm where a mill is erected; the value and abundance of other crops, in consequence of the clearing and pulverising of the soil; and the trimmings of the beets, which Chaptal considers to be in 12,000 lbs. sufficient food for 25 or 30 swine. We subjoin for the benefit of the interested and curious, the following *estimate* for a factory in the United States on either of the ordinary French systems, to make 300,000 lbs. in six months, from the first of August to the first of February.

Expenses.

3000 tons beets, raised on the farm at $2 exclusive of rent	$6,000 00
Labor in the factory, 10,524 days' work, at 75 cents	7,893 00
Fuel, 500 cords, at $2	1,000 00
40,000 lbs. bones for manufacturing animal black, at half a cent	200 00
Lime, acid, &c.	100 00
Lighting, insurance, taxes, and repairs	600 00
Superintendence and book-keeping	2,000 00
Interest on capital invested in land, buildings, machinery, and utensils	2,000 00
Interest on floating capital	1,067 58
Contingencies	1,000 00
Total	$21,860 58

Products.

300,000 lbs. sugar at 6 cents	18,000 00
Pulp and molasses, consumed on premises	5,000 00
Total	$23,000 00
Deduct expenses	21,860 58
Remain net profits	$1,139 42

Deducting from the expenses the value of the pulp and the molasses, we have $16,858 58, which, divided by 300,000 gives 5, 2, 3 cents the pound. The pulp would be upwards of 10,000 lbs. per day, sufficient to feed 100 bullocks, and 600 sheep; and the trimmings and remnant of pulp, 100 swine. Labor is much dearer than in France, but Mr. Child thinks this would be balanced by rent and fuel. This applies to large factories. There is another question as to the small household manufacture. Here Mr. C. is not so sanguine, as it requires skill and science to make it profitable, more than most common farmers have or will get. He says, too, there is no efficient apparatus, which is simple and cheap enough. Still he believes the

time will come when sugar mills will be set up by the more forehanded, as cider mills now are; and sugar beets, which may be produced by those who cannot afford to build a mill, will be carried to their neighbors, and worked up on shares as cider is made among us, and as wine is made in the French communes. In the east, he observes, there are itinerant sugar makers, who are provided with a moveable apparatus which they establish under a bamboo shed in a given neighborhood, and work up the canes as the cultivators bring them in. Mr. Nosarewski suggests this as a practical mode of domesticating the beet sugar manufacture in Poland, in connexion with his system of drying the beet. Details are given, to show that raising the beet, simply, would hardly fail to be profitable here. In this case, the climate comes to be considered. There has been a common belief abroad, that a northern climate alone would do, and that 45° was the true boundary. This is considered a mistake, (derived from the fact, that many of the establishments, and especially the early ones of the south of France, miscarried from other causes,) as in the first place all plants are found richer in oleaginous, aromatic, and saccharine properties, the farther we go towards the equator; and in the second place, that the beet does not depart from this law, we know by experiments on samples raised in the extreme south. Humboldt found that the same law applied to different altitudes, on the table lands of Mexico. In 1836, eight factories then in the department of Vaucluse and in Languedoc, made 1,131,000 pounds of sugar. These are all situated south of 45°. The business has been introduced into the kingdom of Naples, where one of the principal advantages expected, is the production of two crops a year, and the supplying of fresh material from the field, all, or nearly all the year round. Mr. C. is not yet informed of the result of this enterprise, nor of a similar one undertaken in one of the West India islands, where beet and cane have been placed side by side for a *fair race*. This last, will be awaited with no small interest. It appears that beets ripen earlier in the United States than in France, the summer heat being more intense.

At Northampton, beets sown the first of June the last year, were perfectly ripe on the first of September, whereas the period of growth and maturity is never estimated in France at less than four months. This will enable our manufacturer to begin his operations a month earlier than in France, and of course to have seven months for working up the green beet in lieu of six; besides which, he will not be obliged to lay up so large a proportion of this material in pits. As to soil, the beet seems by no means very particular. Whatever will do for indian corn, will do for that.

As all that concerns the beet now is a matter of great interest, we should notice Mr. Child's remark, that the common wild sea-beet, is thought by many to be the parent of all our numerous species. This grows in Holland and Great Britain on the salt marshes, and is found about Nottingham in England. The first beet planted in France, was however, a native of the southern and maritime regions of Europe, and was brought from Italy. The Romans were acquainted with the white beet. The uses made of this vegetable are worthy of notice. Besides furnishing sugar, it is also used for making coffee, beer, brandy, spirits of wine, potash and paper. There are establishments, on the continent and in England, where these respective products are obtained in abundance. Mr. Child mentions also, without contradicting it, the late rumor that they are making wine of the beet in France. And yet even the beet, it would seem, may be supplanted, for we are told "other plants usually grown in our soil are capable of furnishing sugar, and that some of them may be found worth cultivating for that and accessory products. We have tried Indian cornstalks and the pumpkin, and have obtained from them good sugar and molasses. Perhaps those crops may alternate advantageously with the beet. If the manufacture of sugar from the stalks of Indian corn can be reconciled, as we believe it may, with the maturity or near maturity of the ears, this source of saccharine may supersede the beet root. The seeds of the pumpkin yield a fine sweet oil, but we have no means of judging what quantity of this product can be obtained from a given extent of land. If it should turn out satisfactorily in this respect, the pumpkin may one day overshadow the sugar cane.

We have spoken of the Northampton experiments as the only ones of note in this country, and they are so. Yet others we hear have been made to such an extent as to encourage an attempt in Burlington, New Jersey. An establishment is about being raised, to operate on the method of Sorel and Gautier, which has lately made some noise. It seems they grate the beet with a hand grater and deprive the pulp of its saccharine by an instrument they call the *Extractor*, which they declare completely exhausts it, and gives a purer liquor than either pression or maceration, properly so called. A complete apparatus of Sorel and Gautier capable of working up 600,000 pounds, is stated to cost $1254; the rated expenses of operating to that extent $1881, and by the grater and presses $2337; the amount of product 42,000 pounds, instead of 30,000 pounds as by the common systems; and the cost of the sugar will be only 2½ cents per pound. As to this, "*We shall see.*"

One word by way of caution. We advise no body to make a hobby of the sugar beet. For speculation purposes, it is no touch to the morus multicaulis: and that humbug is pretty much used up. If any money is to be made out of beet sugar culture, it will only be by hard work, and perseverance, probably amidst many discouragements. We would not recommend that every body should go into it at once. Let Mr. Child and a few others make the experiment first. If it succeeds, others can follow them. If it does not, they can save their money and their patience. It is however a branch of industry which *may* become extremely important in this country. The value of sugar imported into the United States from foreign countries, is about $7,000,000 per annum. If we can grow all this sugar at home, or a part of it, at cheaper rates than we can import it, we had better do so.

P. S. Since writing the above, we find it stated that application has been made to the legislature for the incorporation of a company in this city, with a capital of $500,000, "for the purpose of manufacturing sugar from beets, and refining sugar."

ISABELLA GRAPE VINES—WINE, &c.

From the Cultivator.

The cultivation of grape vines and making of wine is getting to be so well understood throughout the United States, through the medium of our excellent agricultural periodicals, that what I am about to write, is probably already known to some of your readers; yet the repetition of interesting facts is often of much benefit, and the results of experience in these matters can scarcely be too often repeated.

The very numerous attempts to raise grapes from foreign vines in the *open air*, have resulted in disappointment. The late Mr. Parmenter, of Brooklyn, Long-Island, devoted much labor and expense on foreign vines, to very little purpose. Mr. Loubat, also near Brooklyn, planted a large vineyard, and for some years flattered himself with *hopes* which resulted in loss or disappointment. In some few instances in Brooklyn and New York, where the vines were protected by surrounding buildings, the Chesselas and other foreign varieties yielded well, thereby only demonstrating that such fruit *can be* obtained if cultivators will be at the trouble of erecting proper houses for the purpose.

The Isabella grape vine is supposed to be a native of North Carolina. It first obtained its well deserved notoriety at Brooklyn, in the garden of Geo. Gibbs, Esq. now of St. Augustine, Florida; and derived its new name from his lady, Mrs. Isabella Gibbs, who was instrumental in obtaining it from the south for her garden. The original parent of all the Isabella vines is now to be seen in the garden of Zachariah Lewis, Esq. on Brooklyn heights. This favorite vine has spread itself throughout the northern states of the union, in Canada, and has been imported into France, and drawn forth the favorable notice of the French cultivators. Almost every garden and doorway in Brooklyn and New York can boast of its prolific vine, always yielding abundance to the careful cultivator.

In the year 1827, I set out, at a small place near Brooklyn, the cuttings for about 300 Isabella vines, and fifty foreign vines from France and Germany. By reason of careless cultivation from bad tenants, they did not come into bearing until 1831, in which year I was able to exhibit five kinds of very fine grapes at the horticultural exhibition in New York. I also sent large quantities to the market, and made about fifty gallons of wine, merely as an experiment, as I supposed myself to be the first who had attempted to make wine of this grape. This wine was of two kinds, made in October, 1831, and in April following was put into bottles, and one bottle of each kind sent to about fifty persons in different parts, who were supposed to feel an interest in the matter. One kind was made of pure juice, to which two pounds of sugar to each gallon was added. The other kind was composed of one-third water to two-thirds juice—three pounds of sugar to each gallon—one gallon of brandy to a cask of nineteen gallons. Some of this wine attained five years, and was pronounced very excellent.

In the year 1832, my little vineyard bore very abundantly, and I made, in October of that year, eight barrels of wine. It was made in a variety of modes, to test the quality of the grape, and did not all prove good; but far the greater part was very excellent and improved with age.

I will now proceed to describe my mode of planting and cultivating the vine, and of making wine.

The cuttings intended for propagation are of any well ripened wood of the *last year's* growth, embracing three or more joints or buds. It is preferred that it should be connected at the lower joint with some small part of the old wood of the previous year. These cuttings are taken from the parent vine at any time between the first of November and first of March and immediately buried in the earth, or put under earth in the cellar, or sometimes the ends are put in a box or basket with earth, and set in a green house, and water occasionally sprinkled on them. In the spring, if they are not placed in their permanent locations, they may be carefully set out in the garden, at one foot apart every way, the upper bud being just even with the surface of the earth. If the season is dry, they will require to be waterd several times to insure their growth. They will grow a foot or more in length the first season. In the following spring they may be transplanted to their permanent places, around buildings, fences, trees, and arbors. I trim the new sprouts down to three or four buds, intending that *two only* shall be allowed to grow, and those to be trained off from the root in different directions, according to the circumstances of your trellis, or supporter. My vineyard was planted in rows, eight feet apart, and vines eight feet in the rows; but after a few years the trellis became so burdened, that I took up and removed one-half the vines, and left them sixteen feet apart in the rows. Each vine, therefore, had sixteen feet of trellis, being eight feet on each side of the root. The two main branches were tied to the lower part of the trellis, and the lateral branches tied to the rails above.

My trellis was composed of four laths, open at the top, as I supposed it was necessary that the sun and air should have a good circulation among the vines; but I am now convinced that a top surface, as afforded by an arbor, is necessary. The great exuberance of the vine causes the new shoots to run up into the air above the trellis, and the wind will prostrate and break them, unless they have a flat arbor to rest upon. The fruit hangs with great weight on the branches, which are often broken unless they can rest on an arbor, or are well tied to the upright supporters.

As there are *four* distinct *prunings*, or trimmings, required in properly cultivating the Isabella vine, I will now describe them; merely remarking, that although the vine will give fruit when some of these trimmings are neglected, yet no cultivator has a right to expect *good fruit* without bestowing the requisite time and attention to their prunings.

First the winter pruning. This is best done in February or March, provided the vines are not frozen; but may be done at any time between October and April. It consists in reducing the old wood according to the extent of your trellis, and the age of the vine, and strength of the root. All unripe wood is cleared off—old wood thinned out, and ripe wood of the *last* year's growth shortened down to two or three buds, *except* such runners as shall be selected to cover the trellis. Much depends on judgment in this trimming. It is diffi-

cult to describe the precise rules. Those who love the grape should *cut boldly*, and acquire knowledge by experience and close observation. Every branch should at this pruning be strongly tied to the trellis.

The second pruning; or building, takes place about the 10th of May. The buds have then thrown out their branches an inch or two, and generally two or three branches at every bed, or joint. These must all be reduced to one shoot, or branch, always leaving the stoutest or best shoot. They are disengaged with a slight touch, and a short time would suffice for many vines.

The *third* pruning takes place about the middle of June, and sometimes earlier, and is best performed with a pair of shears, or scissors. At this time I cut off what were called *laterals*—a branch growing out of the green wood on the side opposite to the fruit. These laterals may be broken or cut off quite down to the main branch at any time during the season; but it is better to remove them early before they have acquired size and at the expense of the rest of the vine.

The *fourth* and last pruning is called *stopping*, or *shortening*, and is done with a shears or a knife. It should be done about the middle of July, when the fruit has attained about half its growth. I then shorten all the branches having fruit on them, (except those retained for permanent runners,) by cutting them at two or three joints forward of the fruit. This is a heavy and essential pruning, and divests the vine of much green wood and leaves, and is considered important to the developement and ripening of the fruit. I would, however, particularly caution the operator against at any time removing the *leaves* of the vine, except such as are attached to the laterals and shortenings, and come away with them. The leaves are vitally important to the ripening of the fruit, which is always the best in the deepest shade. Such fruit as by accident becomes exposed to the sun, is sure to be very inferior and sour.

About the 8th of June, while the vine is in flower, and throwing its peculiar and delicious perfume all around, its greatest enemy, the *rose bug*, makes its appearance, and feeds with voracity on the sweet and delicate blossom. In a few days after their first appearance, thousands are seen, carrying destruction throughout the vineyard. The best remedy I could ever devise, is to go among the vines early in the morning, before the sun has warmed them into activity, and they are then easily made to fall into the hand or on the ground, and may be crushed and destroyed. A few mornings spent in this way will clear the vineyard, as they are a short-lived enemy.

In the latter part of July, the *blight* or *rot* takes place where the Isabella vines are cultivated in fields, but it is seldom seen among those cultivated in cities. Great quantities of fruit will become brown, and sometimes black, and fall off. It is not easy to account for this destruction, which is seen as much on the high as on the low vines, and no less on fruit exposed to the sun, than on that in the shade. As an experiment, I discharged with a syringe, lime-water, sulphur-water, and soap-suds upon them, and also sifted dry sulphur on the fruit, but without any sensible effect. I feared I should lose all my grapes, but to my surprise, I had a great crop, notwithstanding the rot. I have since supposed it may arise from exuberance of the vine, which, like the peach and apple tree, may perhaps thus disburden itself of a portion of its fruit; but even on this principle it is difficult to account for its non-appearance in cities, where the quantities of pure fruit are quite astonishing.

I have observed in the cities, that spiders and caterpillars are in some degree destructive to the green fruit. Spiders will get to the centre of the clustre and cause the fruit to fall in single grapes, but the caterpillar attacks *the stem*, and the whole green cluster falls to the ground.

I have in a few instances trained the vines upon large apple trees; but I do not think this mode is to be recommended where other supports can be had. The fruit was inferior.

In the city of Brooklyn, and among high buildings, my vines have not failed to produce abundantly every season, during the last fourteen years. This is an interesting fact to all who cultivate the grape. At my vineyard in the country, they have declined very much, which I attribute to the neglect and ignorance of the tenants on the place. Even in the country they are much better around the buildings than in the open air. There are from three to five clusters on every fruit-bearing branch. I have in a few instances seen six. The extremities of the vine generally produce the best fruit, and there is often much difference in the quality of the fruit on the same vine. They may be trained a great distance over large arbors, and on the roofs and around the upper windows of our high houses. New branches will sometimes grow from twenty to thirty feet in one season.

The vine is sometimes propagated by *layers*, which consists in bending down the branch into a channel dug in the earth, and burying it at proper depth, in a curving line, with the end above the earth. Roots will start plentifully from the part in the earth, and when it is well rooted may be cut from the parent vine and transplanted. If proper care is taken, the cuttings as well as the roots may be sent a great distance. I sent a quantity of cuttings, packed in moist sods in a box, via New Orleans to Arkansas, and had the satisfaction to learn they were all alive on their arrival, and had been successfully planted out.

Nothing is lost in a vineyard, as the green trimmings in summer are good for cattle, and winter trimmings, when not required for propagation, make good fuel.

Of Wine.

Although I was successful in making some good wine, yet a portion was spoiled, and I do not flatter myself that I know much about it. An excellent little book, published by Mr. Adlum, of Georgetown, who was a great cultivator of grapes and manufacturer of wine, was my best guide in wine-making. I would respectfully advise such as wish information on this subject, to obtain it, and follow the rules there laid down. My experience, however, may be of some service, and I cheerfully give it.

The grapes were gathered and thrown into tubs, without breaking the clusters, or separating the ripe from the unripe. The were broken by a common pounder, and merely cracking the skin is sufficient, and care should be taken that the

seeds be not broken. The *murk* or *pomace* is thrown into a *vat*, which is covered with one or more blankets, to confine the heat and hasten fermentation. A portion is sometimes warmed and added to the mass, to give it a start. The pomace rises on the top, and the whole will continue to rise and ferment upwards for four or five days. When it begins to sink, the fine liquor, as clear as oil, may be drawn by a tap from near the bottom of the vat, as long as it will run clear. This makes the *best wine*. The pomace is then pressed in any convenient mode, and all the juice extracted. The liquor is then called *must*, and in this state it is when any addition may be made, such as sugar or brandy. Nothing will incorporate well unless added before fermentation. I added in different casks from one to three pounds of sugar per gallon, but I would advise the adding of the three pounds per gallon in all cases, and I am not certain that a less quantity will preserve the wine from running into the acetous fermentation. If properly made the wine does not require brandy, nor any other spirit, and is much better without it.

After the sugar is added in due proportion to the must, it is put into casks in a moderately cool place, and just filled to the open bung, and allowed while fermenting to overflow. It will work briskly for a month or more, and when it sinks in the cask, must be filled up, so as to continue to overflow. It is best to *stop the fermentation* before it quite subsides, in order to preserve the fine aroma of the wine; and this is done by repeated *rackings*, or drawing off into casks previously smoked with sulphur, by burning in them rags dipped in melted brimstone. If any particular flavor is desired to be communicated *artificially*, it must be done while the must is in early stages of fermentation. It will probably continue to ferment after this first sulphuring and racking; and it may then be fined, or clarified. Many substances may be employed in this. Whites of eggs—milk and sand—fish-glue, sometimes called isinglass, may be stirred into the wine, which may be racked off in a week or ten days afterwards. At every racking a quantity of sediment is removed from the bottom of the casks, and these rackings and finings must be continued until the wine is perfectly pure. I commenced my wine making in October, and considered it fit for bottling in the March following, when it was put into bottles, demijohns, and tight casks.

Even when *new*, the wine is exceedingly good and palatable, and diffuses an inward glow, grateful, cheering and healthful. The taste and aroma are different from any wine that I have ever known, and I cannot compare it with any.

I ascertained that a measured bushel of grapes, as they came from the vines in clusters, weighed thirty-eight pounds. I also weighed one hundred pounds of grapes and crushed them, and obtained a little more than nineteen gallons of juice; it thus requires eleven or twelve pounds of grapes for each gallon of wine.

The location of my vineyard being considered unhealthy, I have given it no personal attention since 1832, but many persons in and about Brooklyn have made good wine from the Isabella grape since that time; and I do not doubt that others will follow their example, until the Isabella wine shall become a favorite at the tables of our best connoisseurs.

There is much to be learned concerning the cultivation of the vine, and I look to the correspondents of your excellent agricultural journals, for information on this as well as other branches of these interesting pursuits. In this town last season the Isabella grapes did not come to perfection, and were sour and worthless; yet I had excellent grapes from the fine vineyard of my friend, Josiah Dow, Esq., of Brooklyn, which is twenty miles west of this place. I should like to know whether manuring is desirable? what kinds, and to what extent? what protection is best? and whether my mode of trimming is, or is not, well adapted to perpetuate the vine?

In conclusion, I would remark, that the Isabella grapes are *eatable*, and often in the market long before they are *ripe;* and consequently many people are ignorant of their excellence when in *perfection*. I give it the preference to any grape I have ever tasted, and the vine is the greatest bearer I have ever known.

ALDEN SPOONER.

Hempstead, Long-Island, Feb. 15, 1838.

From the Southern Cabinet.

NOTES ON EUROPEAN AGRICULTURE. BY A CHARLESTONIAN.

NO. II.

I stated in a former number that, in my opinion, England was in a higher state of cultivation than any other country in Europe. This is in part owing to the industry of its inhabitants—to the intelligence of those under whose direction the lands are cultivated—and not a little to the climate itself. The persons connected with agriculture in England may be divided into three classes. First—the owners of the soil. These are, in the majority of instances, composed of the wealthy nobility. The property is usually entailed, and the laws of primogeniture assign it to the eldest son. He seldom cultivates his lands, but hires them out in large tracts to the second class—the farmer. This individual leases the land, commonly for a term of nineteen years. He is usually well-educated and intelligent, and is able to introduce those improvements in agriculture which the lights of science, and the experience of others encourage him to adopt. The manual labor is performed by a third class—the peasantry. These are usually poor and ignorant, and have scarcely any hope of rising beyond the condition of serfs. They are the cultivators of the soil from generation to generation, and the sons and daughters in nearly all instances, follow the condition of their parents. This is the class which, above all others, is most benefited by a removal to America. In England provisions are high, and the price of labor cheap; in America, it is, in general, the reverse. Here, the industrious husbandman is soon rescued from a state of dependence and poverty. Lands in our new settlements can be purchased at a less cost than the taxes would amount to in England. Hence the difficulty of obtaining laborers on our American farms will, for a long time, present a serious obstacle to our improvements in agriculture. Man every where struggles for independence, and he will not labor for others when he has

so fair a prospect of becoming the owner of a farm. But the strange and wayward climate of England, unpleasant and uncomfortable, as it may be in many respects, may give us a clue to the secret of its fertility. With the latitude of Labrador, its winters are less severe than those of Maryland. Surrounded on all sides by contending oceans and currents, it partakes of their variable climate—it is a land possessing the atmosphere of the sea. The gull and the tern fly over it as if it were a part of their possessions, and the Solan goose and other sea-birds not only nestle among the beetling rocks, but their notes are heard in every part of the island. Within three days' sail of England, the fogs and drizzling rains commenced. My journal tells me there was but one day out of forty in which it did not rain during some portion of the day. I heard no thunder, nor did the rain fall in torrents as with us, but light showers were continually sprinkling the earth like heavy dews—then the sun would shine for half an hour, throwing its rays in fitful streams through the passing clouds, giving slight indications of fair weather, which soon ended in disappointment. There is no calculating on a dry day in England. An umbrella is almost as necessary an appendage to an Englishman as a hat. It is no wonder that he is enraptured with the bright clear sky of Italy, for he was born among fogs, and has all his lifetime been looking through a haze. He judges by contrast. Others have told the tale of the azure skies and balmy air of Rome and Venice, and his imagination has been fired by the theme; hence he conceives no sun so bright, no air so soft. Had Carolina been as accessible, and could he as easily have made the contrast, he would, if not blinded by prejudice, have admitted that no Italian sky exceeded that of our own southern land. Men may boast of having climbed the Alps to see the sun rise from the mountain of Riga, or set in the Adriatic, yet I am either so prejudiced or old fashioned as to believe that the poet or the painter may go to the ends of the world and find no fairer sky for the embellishment of a picture than that presented during summer, along our Southern Atlantic coast. But to return to the foggy climate of England. It has appeared to me that these incessant slight showers in a high northern latitude, (where the nights are so short, and the continuance of twilight so long, that I find it noted in my journal that I was reading by daylight at half past ten in the evening, and resumed my book at half past two—leaving but four hours of night)—contribute, in a considerable degree, to the abundant productions of the soil. The sun, during the long days of summer, imparts sufficient warmth to the nourishment of the plants, and these are continually kept fresh and green by nature's watering pot. It is true, the early part of the summer of my visit (1838,) was characterised as rainy in every part of Europe, still it was not regarded in England as a very striking exception to their ordinary seasons. To the fogs and drizzling rains together with the absence of too bright a light, I ascribed that rich dark green of the fields which I have never witnessed in any other country—the scent of the flowers was, for the same reason, stronger and longer retained—the groves were full of melody—the goldfinch and the thrush seemed to sing sweeter after every passing shower, and the skylark carolled high in the air, in spite of the drizzling mist.

But, in addition to a favorable climate, the soil of England has the benefit of a judicious tillage. I was particularly struck with the system, almost universally adopted in regard to the rotation of crops. It should be remarked that they never cultivate two successive crops of grain on the same field. Although physiologists have not been able fully to account for the fact, that the successive cultivation of grain or vegetables exhausts the soil whilst a change to different product does not impoverish the land to any considerable extent, yet it is now universally admitted, by all good husbandmen, that this is the case. Some have ascribed this to the exhaustion of the proper food of the plant in consequence of its cultivation during successive years, whilst Decandolle, Macaire and others have accounted for it on the doctrine that plants exude from their roots certain substances poisonous to plants of the same variety, which in time renders the earth unfit for their cultivation. (See January number of the Southern Cabinet, p. 17.) As *toujours perdrix* cloyed on the appetite of the Frenchman, so the teeming earth longs for a change of food, and withholds her fruitfulness unless she be indulged. It has often been inquired why is it that a forest which has long been covered with a growth of pine, when cut down does not spring up again in pine, but in oak, gum, and hickory, and *vice versa*. The facts, in a majority of instances, are so. All plants spring from seed—there can be no spontaneous production. *Omnia ab ova* is a doctrine as old as the days of Linnæus, and nature has never departed from it. May it not then be that nature, after having for ages nourished one kind of tree, has exhausted the properties of the soil adapted to that kind of production, and when a new forest is to be created, imparts its influence to trees of a different kind, better suited to its present state, and withholding its fertility from that to which it is no longer adapted. Be this as it may, the English farmer acts on the principle of the necessity of a rotation of crops. The result from this and other judicious modes of culture has been an increase of three fold. In Carolina, we have adopted the opposite course. Many fields have been planted in Indian corn since the days of the revolution, and the result has been that we have retrograded from forty bushels per acre to eight, and often less.

I will now give the method of English culture in regard to the

Rotation of crops.

1st year. Fallow crop. Irish potatoes—beans or turnips. The potatoes, as is the case in high northern latitudes, produce small stalks, and are consequently planted much nearer in the rows than with us. Endless varieties have been produced from seed.

The beans, adapted to field culture, are the kinds usually called horse bean *(Faba vulgaris.)* Hundreds of acres are cultivated with this bean, and its numerous varieties, and the product is immense. It is used as food for cattle. I have never known it to thrive equally well in any part of America, probably owing to our warm summers. In our southern states especially, the pods in general do not fill well, and I doubt whether it is calculated to be a productive crop. There is, however, one variety from the south of France, called the winter bean, *(La Féverole d'hiver,)* which is remark-

ably hardy and prolific. It is planted late in autumn, and stands the winters of France and England, and might be experimented on, as a winter crop, when nothing else can be cultivated with us, and it would not interfere with the crop of the following spring. The Heliogoland bean—purple field bean—and Alexandrian field bean, are also varieties which the agriculturists of England and France recommended to me as probably well adapted to winter culture in our southern climate.

The turnip crop is considered as the most valuable in England for feeding cattle. These different productions, however, require to be noticed under separate heads. I will endeavor to return to the subject in a future number.

2nd year. Wheat—the varieties are yearly increasing. At present, the kinds cultivated almost universally in the higher grounds and lighter soils of Scotland, are the golden drop and blood red. The skins are thicker than in most other varieties and they yield more bran. These varieties would, I think, answer well on our elevated mountainous regions. The average crop is said to be about fifty bushels to the acre. In the Lothians—the Carse of Sterling, and in the low rich soils of England—in Denmark—and the alluvial soils of Germany, I remarked that the varieties called Uxbridge and Hunter's wheat, were most cultivated, and considered most productive. The yield is from fifty to sixty bushels per English acre—the average weight per bushel is from 62 to 63 lbs.—the finest, 65 lbs. The Mengoswell's wheat is a variety of Hunter's and is cultivated on the Carse of Gowrie as a superior grain. Three new varieties have been very recently introduced. The Whittington wheat from the south of England—the Chevalier wheat from France—and the Hicklings—the latter is white in straw, but yellow in sample. Rye is not cultivated. Grass seeds are sown in the fields of wheat in the month of April. These are red clover (*Trifolium pratense*) and rye grass (*Lolium perenne* and *Italicum.*) Calves and sheep are allowed, in autumn and winter, to feed on the young grass.

3d year. This is a grass crop—usually a heavy one. It is sometimes cut twice, but usually only once a year, and serves as pasturage in the fall.

4th year—A crop of barley or oats is now raised. This is once more succeeded by a fallow crop. In this manner crops succeed each other by fours in good lands, or where the soil is inferior, another year is added for grass and pasturage—affording a wheat crop only once in four or five years, but producing in the mean time, other articles equally valuable to the farmer.

(To be continued.)

VALUE OF BIRDS.

From the Farmer's Monthly Visitor.

Mr. Hill,—I was much pleased, that in your first volume of the Visitor, you took so much interest in the preservation of the small birds. Without their aid in destroying the innumerable insects that prey upon the products of the farmer, agriculture in a few years would have to be abandoned. The rapidity with which many kinds of insects are produced is almost beyond conception, and were it not for the check put to it by insectivorous birds, it would be in vain to sow or cultivate the soil. And many think it doubtful policy, in giving a bounty for the destruction of crows and foxes.

The crow, it is true, sometimes plucks up the newly planted corn; but where he pulls up one blade of corn, he probably pulls up a hundred of the large white worm. So of the fox, he carries off a few lambs, and sometimes a stray goose, but his principal food in the summer season is the large white worm, beetle, bugs, mice, moles, &c., which probably more than compensate for the few lambs they take.

Could the exact amount of damage done by insects to the various crops of grass, grains and fruits, in a single county, for one year, be ascertained, it would be astonishing. Two years ago last season many fields that produced a good crop of hay the year before were almost barren: scarcely a blade of grass was left on many square rods, and the roots were so completely cut an inch or two beneath the surface, by the large white worm, that the turf might be rolled up like a carpet.

Sometimes whole fields of corn are nearly destroyed by the grub, or the wire worm: orchards are defoliated by the canker worm or caterpillar; and fields of most promising wheat are destroyed by the wheat fly or weevil.

The natural history of the various kinds of injurious insects is not sufficiently studied. No doubt nearly every kind might have its life or history traced through all its various changes, habits, food, &c., and probably ways and means discovered to greatly lessen their numbers and check their ravages.

In a late number of the New England Farmer the editor says, "We as yet know of but one effectual remedy against the canker worm—that is, the encouragement of the birds. In our code of penal justice, killing a small bird should be placed next to killing a child. We were assured the last summer, that at the beautifully cultivated district in the south part of West Cambridge, abounding in fruit, they were entirely free from canker worms, while in Old Cambridge the orchards suffered severely. The great security which they found was in the encouragement and preservation of the birds. A gunner in West Cambridge would be in as much danger as an abolitionist in South Carolina."

February 12, 1840. L. B.

EFFECTS OF EMANCIPATION IN JAMAICA.

An intelligent resident in Jamaica, recently informed us that the results of the emancipation bill ultimately would be, the expulsion or retirement of all the white population of the island, already so disproportioned to that of the colored classes; and that, at no great distance from the present time, it would come to be a St. Domingo. Had the emancipation or apprenticeship system been left to the white colonists themselves, or had their disparity in numbers with the colored population not been so great, no doubt is entertained that the legislation of the British parliament at London would have been nullified in Jamaica; but, as the case stood, acquiescence was only the necessary act that could fall with quieting effect on crushed rebellion. No new demonstrations in favor of equality between the colored and white population have

been afforded by the emancipation bill: since those on the part of the persons of color, who attain any conventional distinction among the whites of the island, stand aloof from those having the hue of themselves, and consort with the whites as instruments, merely, and proud of that distinction. Colored magistrates sit with white ones on the bench judicial, though their expoundings and explanations are doubtless much guided by the latter. Real estate has not been materially affected by the bill in question: but the likelihood of no indefinite continuance of the whites on the island in after times, would seem to make it more an object with them, to dispose of it briskly to those of means and influence among the citizens of color who may thus finally acquire by purchase, or conduct with honorable agency, all the interests of the whites now on the island, who may receive the benefits of their property on *absenteeism* principles, after they shall have left it alone in its glory, until fully paid.—*Philad. Gaz. (Whig.)*

CHEAP STEAMER FOR ROOTS.

From the Cultivator.

The *best* and *cheapest* apparatus for steaming roots, &c. we have yet seen, is made, by putting to a box of the required dimensions for cooking or steaming, a bottom of sheet iron, and setting this box on an arch of brick or stone work, allowing about four inches of each side of the box to rest on the brick work. Let the box be made of inch and a half or two inch plank; the sheet iron with a double row of holes for nails, secured to the bottom of this, will be water tight, and a false bottom made of a board, and perforated with numerous holes, with cleats nailed on it to lie on the iron bottom, and prevent the roots burning on it, completes the steamer. We have used one made on this pinciple, for several years, and know of no plan which will cook food with equal rapidity and cheapness. Our steamer holds 15 bushels, and the fuel required is but a trifle.

METHOD OF PRESERVING CELERY THROUGH THE WINTER FOR FAMILY USE.

From the Magazine of Horticulture.

As a completion of my article on celery, published in your January number,* I send you my method of preserving it for use through the winter. Celery must be taken up in the autumn, before it has been, in the least possible way, injured by *frost*; as I am confident that, if the tops are frozen, it affects, directly or indirectly, the whole root.

A fine dry day, of course, must be chosen for the above mentioned purpose. When the celery is all taken up, cut off *all* the fibrous roots and *all* the green tops, and lay it singly on boards, in an airy shed, to dry, two or three days; turning the whole over once or twice a day will be necessary, in order that every part may be as free from moisture as possible; if this part of the process has been duly attended to, after the third day the celery will be in good order for the next and last operation, which is as follows:—

Having plenty of *dry* sand at hand, place about three inches, in depth, of the same, at the bottom of a flour barrel, or any other kind of barrel will answer, provided it is clean and dry; then lay the celery flat on the sand, and so continue on, with the sand and celery *alternately*, until you finish at the top with sand, about four inches of which should be placed over the last layer of celery, and the work is completed. A dry, cool place, where it never freezes, is to be preferred to keep it in. The operator need not be in the least alarmed, if he finds that it has shrunk a little from the operation of drying; for it will immediately become plump again after packing. He should have faith in the method, and he will be sure to succeed.

J. W. Russell.

Mount Auburn, Cambridge, Feb. 1840.

The above method of keeping celery, by Mr. Russell, is probably as new to most of our readers as it is to ourselves; but we doubt not it will succeed: indeed we have never found much trouble in keeping celery, provided it was not ruined *by repeated freezing and thawing* of the foliage and stems, before it was dug up in the autumn. This part of Mr. Russell's remarks should be kept in view, as without strict attention to this, the object will not be accomplished.

Mr. Russell's remarks, we apprehend, apply only to preserving celery for family use *during the winter*. When a large quantity is grown, and it is desired to keep part of it until spring, before it is wanted, the best method will then be to protect it in the situation where it was grown. This, at least, has been our plan, and we have found it to be attended with complete success. The manner in which we have proceeded to do so, has been as follows:—Before frosts, severe enough to injure the tops, occur, we cover up the ridge formed by the earthing up of the stems, with leaves, sea-weed, or coarse straw, preferring either of the two first to the latter: this covering should extend down the sides of the ridge, and should be about six inches thick, and should be put on in rather a dry state. This covering is to be immediately protected with boards, put up in the form of a ridge also, so as to carry off all the rain, or water which may be formed from the melting snow, in the months of February and March. The top board on the east side, if the rows stand north and south, as they always should do, unless very inconvenient, should project over that, on the west side, from half an inch to an inch, thus allowing no chance for the water to find egress immediately over the roots. By this means, it will be carried away, and if the surface of the garden admits, the earth should be so thrown out in the autumn, as to allow the surplus water in the spring to be carried off from the ground in which the celery is planted.

By the middle of March, unless that month should be very severe, the ridge may be opened at one end, and the celery dug for use; and it may afterwards be dug from time to time, as it is wanted, and it will be found as fresh as if it had been dug in the preceding autumn. We have fully tried this plan, and can recommend it from our own experience.

It should be always borne in mind, that celery,

*And thence copied into the Farmers' Register.—Ed. F. R.

intended for winter or spring use, should be of the large, giant, solid kind, and not the little pipe-stem, suckery variety, generally grown, which is only fit for early fall use, and, at the best, barely worth growing at all. Bailey's red or white giant, and Law's silver giant, are new sorts, deserving of extensive cultivation, and every one who appreciates good celery, should be particnlar, and obtain one or the other of them. Attention to this, and procuring seeds which *can be relied upon*, will prevent much disappointment, and repay the cultivator for his trouble.—*Ed. M. H.*

SEEDS FROM SOUTH FLORIDA.

We have to acknowledge the receiving from Dr. Henry Perrine, of Indian Key, seeds of several tropical plants, which grew in the southern part of Florida. These were, 1st, the "kidney seed cotton," described at length in a former communication of Dr. Perrine in our last volume of the Farmers' Register; 2nd, seeds of the "perennial bean;" and 3rd, seeds of the "coontee root," or arrow root, the natural growth of which furnishes food to the savages. These seeds have been distributed among some of our subscribers who have green-houses, or who reside far to the south.

TEXAN STATISTICS.

The whole story told.—The following minute statistics of Austin are said to be correct. On the first of January, 1840, the whole population, members of congress, speculators, gamblers, loafers, and all, amounted to 856—whites 711. White adult males 550, white adult females 61 ! children 100, families 75, mechanics 35, lawyers 4, physicians 6, printing offices 2, taverns 6, stores 9, groceries 9, billiard room 1, and faro banks 6.—*Houston Star.*

REMARKS ON THE SOILS IN GENERAL, AND PARTICULARLY THE RIDGE LANDS, OF EASTERN VIRGINIA.

For the Farmers' Register.

The peculiar and remarkable features of the highest or ridge lands of lower Virginia deserve more consideration than they have received. These features are scarcely known at all except to the residents of that region, and even of these, very few have cast a thought upon the circumstances referred to, which are general and uniform through an extensive territory, and yet very different from the surface of the earth in general elsewhere, whether considered in regard to agricultural qualities, chemical composition, or geological structure. In presuming thus to refer to geological character, let me not be understood as pretending to any scientific knowledge on that subject, but merely to having observed the great and obvious effects of the removals and deposites of earth by water, which even an unlearned observer may easily learn, although learned geologists have either passed over the facts without notice, or have neither explained nor investigated them.

Strangers to this region, and especially the residents of our mountainous region, are impressed with the belief that the low country of Virginia, is one wide level surface of low-lying land; and even when they travel through it along the main public roads, which are always on the most level routes, they are first struck with surprise to find that there *are* some hills in the tide-water region, and that the land is generally dry, and also high, except near the borders of the Chesapeake bay and the ocean. They are also surprised to find but a very small proportion of low land formed by alluvion, and still subject to be overflowed by the streams which had made the deposite; and indeed, except our tide-marshes and miry and inundated swamps, that in fact there is less wet land in the low than in the high country. Still the traveller who kept on the usual routes of travel would retain the opinion that the country was generally and remarkably level; but if he were to cross those routes, in the direction of the streams, he would form the equally mistaken opinion that the face of the country was remarkably broken, by the frequent alternation of hills and narrow valleys or ravines. Both of these opinions are true to a certain extent, and each is false, if applied generally or extensively.

A correct idea of the configuration of the lands of the tide-water region may be had by supposing, first, an almost perfect plane surface declining by imperceptible degrees towards the sea-waters. Next, suppose this even and slightly inclined plane to have been deeply guttered and furrowed by the passage of every river, and their largest tributary streams, and more slightly by every small brook and rivulet trickling from the highest head sources of streams. Lastly, suppose the hill-sides formed by thus cutting down the channels by the waters, at first necessarily precipitous, to become gradually sloped by the operation of natural and obvious causes, in the course of thousands of years. Such is now the surface of the tide-water region, and indeed, though in a less marked manner, such is the next great region above the falls of the rivers, extending almost to the most eastern spurs of the mountains. Thus, if on any correctly marked part of the map of Virginia, any intermediate point be taken between two rivers, and a course be drawn so as to avoid the heads of every smaller stream that flows to the one or the other river, a route may be pursued for many miles, which would have scarcely any perceptible rise on depression. Such a route, to be kept always on the highest and most level ground, would of course be made very crooked by the numerous head springs of interlocking streams, flowing to both sides; and therefore no such route is ever precisely followed, by a road, or for any practical purpose. Still, if it were done, meandering and zigzag as such courses might be, they would be, to the eye, perfectly level, (and very nearly level even if measured accurately,) and stretching and branching through the whole country, from the sea-coast almost to the mountains. And as nearly all the public roads are on these ridges, and varying from them only to avoid too great departures from the shortest courses, it explains sufficiently why the roads may

be nearly level, even when passing through a very broken and hilly country.

It is not only that these level ridges may be found and traced through their long and tortuous courses between our great rivers—as between the Potomac and Rappahannock, or York and James rivers, but also branches of these principal ridges run out between every two of all their thousands of tributary streams. And though the channels of the smaller streams are of various elevation, and generally higher in proportion as they are of small size, or remote from the great waters into which they finally are emptied, the different characters and elevations of the streams have no bearing on the intervening ridges, which, whether separating the largest rivers or the smallest tributary rivulets, preserve nearly the same general elevation, character and appearance, according to their position and distance from the ocean. Thus, it follows that the dividing ridges, presenting these strongly marked characters, are in fact as numerous as the streams which so abundantly water our country; and which, if pursued to their head springs, and counting every branch of a rivulet, of course are twenty times more numerous and extensive than appear on the maps. These numerous ridges, and all connected, except where separated by the great rivers that pass through the mountains, form the ribs or frame-work of this region, and are as close laid, and as much connected with each other, as the innumerable streams which may be likened to arteries and veins of the great body.

From this description it will be gathered that though the surface of the country is in fact very uneven, and in many parts very hilly, still that all the summits of all the ridge lands form separated parts or curved lines in the same great imaginary inclined plane; and which plane I suppose to have been formerly real and continuous throughout, when the earth was deposited by the great overflowing waters, and before the subsequent action of streams had cut out and washed away, in forming their channels, the valleys through which they now flow.

That the whole tide-water region was once the bottom of the ocean, and for many ages, is manifest from the existence of thick beds of fossil sea-shells, which underlie the whole, or nearly the whole, at depths below the present surface varying from a few inches to nearly 100 feet, according to the dip of the bed of shells, (or marl, as improperly called,) and the thickness or elevation of the now covering upper earth. Afterwards, by some mighty convulsion of nature, this bed of the ocean was lifted up so as to be elevated far above the sea-water, and fresh-water floods poured over and deposited upon it, in different strata, earth of various kinds of texture, from almost pure sand to the stiffest clay, but all agreeing in the absence of calcareous earth, and of any enriching material to form productive soil. The upper cover of all, which forms the present upper layer, and its surface the thin and poor soil of the highest ridge lands, it may be supposed was the last deposite from the deeply covering and then stiller water, and that this last deposite was left over the whole land. There is a remarkable uniformity in this soil, in its shallowness, its poverty, the universal and total absence of carbonate of lime, and the very small proportion of lime in any other form, the absence of stone of every kind, and even of pebbles and gravel. The texture varies from the stiffest and most intractable clay to a very sandy soil. Still this does not prevent a general and remarkable uniformity of character, caused by agreement in other particulars. Still, there is every where a much greater proportion of sand in these soils than would be supposed. The very stiffest soils I have found to contain more than 50 per cent. of pure silicious sand, but mostly so finely divided as, when separated, to be in the form of an impalpable powder, more like the finest wheat flour than grit or sand. It is this state of minute division of the silicious sand, more than the proportion of argillaceous earth, (or the pure matter of clay,) that gives their different degrees of stiffness to all these ridge-land soils.

The gentle slopes and steeper hill-sides, formed first by the streams cutting down perpendicularly and deeply through various strata of earth, and these precipitous descents being in time sloped and graduated as they now are—the materials being mixed by the washing of water, from top to bottom—present soils of various textures and qualities, all of them being much more fertile than the barren ridges, but still far from being valuable at first, and still less for being retentive of their earliest fertility. Sometimes on these sloping lands the soil is very stiff, sometimes very light, sometimes, but very rarely, showing rolled or water-worn stones, and very frequently gravel in great quantity—according as sections of these different horizontal strata have been laid bare, by washing through them, or as these materials were carried down by water and spread over other soil.

Still lower, and only near the tide-waters, the streams have cut through the beds of fossil shells or marl; and thus mixed with the far greater mass of various poor earths washed down from the higher slopes, have been swept down by the torrents, and deposited below, forming the alluvial bottoms, and almost the only naturally fertile lands of lower Virginia, except some of the higher river banks and borders, which have been formed in a different manner.

The supposed agricultural character and value of the ridge-lands and slopes were described in the following words, in the 'Essay on Calcareous Manures.'

"With some exceptions to every general character, the tide-water district of Virginia may be described as generally level, sandy, poor, and free from any fixed rock, or any other than stones rounded apparently by the attrition of water. On much the greater part of the lands, no stone of any kind is to be found, of larger size than gravel. Pines of different kinds form the greater part of a heavy cover to the silicious soils in their virgin state, and mix considerably with oaks, and other growth of clay land. Both these kinds of soil, after being exhausted of their little fertility by cultivation, and "turned out" to recruit, are soon covered by young pines which grow with vigor and luxuriance. This general description applies more particularly to the *ridges* which separate the *slopes* on different streams. The ridge lands are always level, and very poor—sometimes clayey, more generally sandy, but stiffer than would be inferred from the proportion of silicious earth they contain, which is caused by the fineness of its particles. Whortleberry bushes, as well as pines, are abundant on ridge lands—and numerous shallow basins

are found, which are ponds of rain water in winter, but dry in summer. None of this large proportion of our lands has paid the expense of clearing and cultivation, and much the greater part still remains under its native growth. Enough however has been cleared and cultivated in every neighborhood, to prove its utter worthlessness, under common management. The soils of ridge lands vary between sandy loam and clay loam. It is difficult to estimate their general product under cultivation; but judging from my own experience of such soils, the product may be from five bushels of corn, or as much of wheat, to the acre, on the most clayey soils, to twelve bushels of corn, and three of wheat on the most sandy—if wheat were there attempted to be made.

"The *slopes* extend from the ridges to the streams, or to the alluvial bottoms, and include the whole interval between neighboring branches of the same stream. This class of soils forms another great body of lands—of a higher grade of fertility, though still far from valuable. It is generally more sandy than the poorer ridge land, and when long cultivated, is more or less deprived of its soil, by the washing of rains, on every slight declivity. The washing away of three or four inches in depth, exposes a steril subsoil (or forms a "gall") which continues thenceforth bare of all vegetation; a greater declivity of the surface serves to form gullies several feet in depth, the earth carried from which covers and injures the adjacent land. Most of this kind of land has been cleared, and greatly exhausted. Its virgin growth is often more of oak, hickory, and dogwood, than pine; but when turned out of cultivation, an unmixed growth of pine follows. Land of this kind in general has very little durability; its usual best product of corn may be, for a few crops, eighteen or twenty bushels—and even as much as twenty-five bushels, from the highest grade. Wheat is seldom a productive or profitable crop on the slopes, the soil being generally too sandy. When such soils as these are called rich or valuable (as most persons would describe them,) those terms must be considered as only comparative; and such an application of them proves that truly fertile and valuable soils, are very scarce in lower Virginia."

The ridge-lands are universally acid in a high degree; which, according to the doctrines maintained in the work above quoted, is but repeating in other words the great deficiency of lime, and asserting the great value and profit of using calcareous manures on these otherwise worthless soils. It is on ridge-lands that the greatest improvements by marling have been produced in lower Virginia; and when once so improved, these will be permanently among the most valuable lands in the whole region. On some of the lands from which the above quoted picture was correctly drawn, I have since made as much as 35 bushels of corn to the acre, without any manure, except marl; and the land marled at different times, from one year to twenty years before, showed, in the crop of 1839, degrees of improvement increased in proportion to the length of the time which had passed since the first and only application of the manure. It is these extensive and before seeming hopelessly barren lands, which, when marled, will make lower Virginia both a rich and healthy region. For the same defect of natural constitution which forbids these poor soils to hold putrescent matter, and thus store up fertility, causes the products of putrefaction to be diffused through all the atmosphere, for the production of disease; and the same process which will retain the food of plants in the soil, cuts off from the air its previous supply of poisonous exhalations.

In generalizing the characters of the different soils of this great region as above, and attempting to arrange them in separate classes, let me not be understood as meaning that the distinguishing marks belong to all of each class, or that there are always certain and evident lines of separation and distinction between the different kinds of soils named. I have stated the strongest marked features of each, though but a small proportion of the whole surface is so strongly marked. And as the surface is passed over by insensible gradations from the ridge of the slope, there is an intermixture of characters in most places. Thus, ridge-lands of any extent no where preserve throughout their precise rigid character, but in some places more or less partake of that of the slopes. For strictly speaking, the ridges being the precise lines of separation between streams flowing to opposite directions, are extremely narrow; but as the same ridge formation stretches out into the intervals between the side springs, the same general character of soil may spread for miles in width, and over the general surface, with the exception of the narrow margins and very slight slopes of the head springs and their brooks. Again—the soils designated as on "slopes," though being on a surface generally declining from the highest ridges, still are sometimes level for considerable extent, and even take in many of the lower ridges between the branches of small streams. These exceptions, and the grounds of them, are obvious both to the practical observer, and to one who would merely judge of effects from the causes above supposed. The explanation is rendered necessary, however, because the terms used, "ridges" and "slopes," are not sufficiently precise, or descriptive.

In the whole of the tide-water region, to which my description of soils and the levels of surfaces are more especially applicable, though often broken in surface, and even very hilly, (in common parlance,) still, correctly speaking, there is no such thing as a hill between the falls of the rivers and the sand-hills on the sea-shore; that is, there is no spot of land rising from all sides greatly or even considerably above the general level. What are called hills, are numerous enough, and often high, and sometimes steep. But they are only slopes rising from a lower to a higher level, and on the sides of a deep ravine or narrow valley cut down through the general level or plane of all the ridges. The thick forest growth on these ridges, serves to form the visible horizon from every point of view; and that horizon is every where as even in height and as level as it is possible for any forest growth to be.

The very remarkable and continuous levels of the summits of the ridges, notwithstanding their narrowness and crookedness, suggest some other considerations which will be briefly mentioned. They present the most admirable sites for the construction of rail-roads, if the route is at all suitable to the points of supply and demand of agricultural products. The advantages for this purpose are not only in the near approach to a level

surface, and the slight descent that exists agreeing with the course of the heavy products; there are others, in the cheapness of excavation, the cheapness of the land itself, and the abundance of timber, which still covers most of these poor lands.

The lines for railways have always been chosen to suit the interests of existing towns; and therefore there has been but little regard paid to the remarkable facilities offered by the natural formation of the face of the country. Every considerable railway yet constructed in Virginia, crosses the direction of the ridges and the streams, and no where coincides for any considerable length with the summits of a ridge. The survey, however, of the railway proposed from Petersburg to Farmville, (and which, fortunately for the subscribers could not command support enough to be undertaken,) was made for nearly its whole extent on a ridge of the kind described, (that which divides the tributaries of the Appomattox, from those of the Nottoway and Meherrin rivers,) and the report of the engineer served to confirm fully the views above exhibited, and those which caused that route to be chosen. Except for the short distance at each end, where the level route offered by nature was departed from to reach the towns of Petersburg and Farmville, the railway might have been made on as perfect a level as any alluvial flat would furnish, and without crossing a single depression or stream, except from choice, to shorten the distance of the too crooked ridge. But this level route of about 50 miles is far from being the full extent, even in a generally direct line. If the continuation of the most level natural route had been the object sought, and not the termination being made at existing marts, the same ridge might have been pursued, without any material departure from a level or from a direct route, westwardly to the spurs of the mountains, and eastwardly to the tide-water of James River. Again—if after passing above the highest head springs of the Meherrin, another branch route were to be pursued through the south-east part of Prince Edward county, and nearly along the line which separates that county from Lunenburg, and thence south and south-westwardly through Charlotte county to Moseley's Ferry, then such a continuous ridge-route would be found extending about 110 miles from the lower James River to the Roanoke, and departing no where materially from a level, except immediately at its two terminations, where necessary to descend the banks of the rivers. This example is presented to exhibit the peculiar nature and great extent of these ridges, and not to propose such a visionary scheme as the execution of any such railway, or so unprofitable an investment as *any* railway, in addition to those already constructed in Virginia.

Lest it should appear, by omitting the mentioning of them, that there are no other soils in lower Virginia than the ridge-lands and the slopes, with the low bottom lands interspersed among the latter class, I will merely bring to the reader's notice the naturally rich soils of the river banks, which are indeed of small amount in proportion to the general surface, and of various textures and kinds, but all as remarkable for natural and long enduring fertility, as most of the other high lands are for the opposite qualities. These rich but narrow margins of the tide-water rivers, are rarely more than half a mile wide, and sometimes not fifty yards, on the higher banks. On the lower lying lands they are much wider; and some of the largest as well as most fertile farms are formed principally of such soils, as Sandy Point, Brandon, Weyanoke, Westover, Berkeley, Shirley, Curle's, &c., on James River. These bodies of low, though perfectly dry lands, are generally in the form of peninsulas, or "necks," extending into the river, and their formation was manifestly the result of ancient alluvion, or by the deposite of a wide and deeply overspreading flood, which was poured in a torrent in the same direction as the now low and gentle current continues to flow towards the ocean. To return to the supposition presented (for the purpose of illustration,) in the first part of this article, it would seem that when the whole territory was covered with one uniform and level deposite of earth from a previously covering flood, and that, after the earth was left naked, the rivers remained dammed up, and unable to pass by sufficient channels to the ocean. But that at last the barriers gave way through the present channels of the rivers, and the enormously accumulated flood passed off, leaving abundant evidences of its effects produced in that passage, when the volume and force of the water was perhaps a thousand times greater than of the rivers in their present state. The obvious alluvial origin of the lands above named, and many others, though they are far higher than the present highest waters, the depressions furrowed out in the peninsulas and promontories, and their direction towards the east, the order in which earthy deposites were left, in conformity with the laws of specific gravity and the suspension of solids in moving water, the narrow fertile margins of the highest of the river banks, all show beyond question the former action of either the still or the rapid waters of a flood perhaps 100 feet higher than the present level of tide. It was by the intermixture of soils thus caused, and especially by the bringing down and spreading widely the fine calcareous earth from the mountain region, that the very narrow strips along the tide-waters were made so fertile, and present so striking a contrast to the great body of the country. This small portion of land was thus *marled* and made fertile by the direct agency of the Creator; and to those of his creatures who would rightly observe and reason upon this operation, it also offers a revelation to men, and instruction conveyed by practical illustration and example, of the manner in which they may proceed and themselves imitate, if not quite equal, the great fertilizing works of nature. E. R.

GRAFTING ON THE WILD CHERRY.

From the New Genesee Farmer.

Some three or four years since, I observed an article in the Genesee Farmer, stating that the cultivated cherry would not grow when inoculated or engrafted on the wild black cherry. Seeing no good reason why it should not, I determined to try the experiment. I procured and planted some of the seeds; they grew and produced fine thrifty stocks. A year ago last summer I had some of them inoculated from our best English cherries. I examined them in the autumn, and they appeared to do well. Last spring, I had some fifty

or sixty others engrafted; they appeared to adhere finely, soon after pushed out their leaves and grew vigorously; indeed, they appeared to be doing quite as well as those worked on the stocks of the English Mazzard cherry. I then came to the conclusion that the story of their not growing on the wild cherry was all humbug. And had I possessed more leisure at that season of the year, I fear that I should have come out with a communication, stating my success in the experiment. But soon my grafts and buds began to wither, and before midsummer the most of them had ceased to be. Some few have remained green during the spring and autumn, but I do not expect to find one of them alive in the spring. B. H.

Buffalo Nursery, January, 1840.

N. Y. STATE AGRICULTURAL CONVENTION.

From the Cultivator.

Assembly Chamber, February 4, 1840.

The convention was called to order by Mr. J. J. Viele, of Rensselaer, on whose motion the Hon. George W. Patterson, of Livingston, was called to the chair, and Jesse Buel appointed Secretary pro tem.

On motion of Mr. A. Van Bergen of Greene.

Resolved, That a committee of five be appointed to report suitable names for officers of this convention.

The chair appointed Messrs. Van Bergen of Greene, Beekman of Columbia, Viele of Rensselaer, Tucker of Albany, and Johnson of Kings, said committee, on whose report the following gentlemen were unanimously appointed officers of the convention

ROBERT DENNISTON, of Orange, *President.*

CHAS. E. CLARKE, of Jefferson,
JEREMIAH JOHNSON, of Kings,
DANIEL TOFFEY, of Dutchess,
BENJAMIN ENOS, of Madison,
} *Vice Presidents.*

LUTHER TUCKER, of Albany,
HENRY D. GROVE, of Rensselaer,
} *Secretaries.*

The counties being called over, about one hundred delegates enrolled their names as members of the convention.

On motion, *Resolved*, That Messrs. Beekman, Bement, Van Bergen, Nott and Bergen, be a committee to report the business to be presented to the convention.

On motion, of Mr. Beekman, Messrs. Duane, Viele, and Buel, were appointed a committee to examine a book called the Farmers' Library, and report upon its merits as a common school book—the book having been submitted by the author for that purpose.

The following preamble and resolution was introduced by Mr. Nott:

Whereas, a bequest has been made to the people of the United States, by the late Mr. Smithson of England, for the purpose of improving the intellectual and moral condition of mankind, leaving it to the congress of the United States to designate the mode of its application; therefore,

Resolved, That a petition, signed by the president and secretary of this convention, be presented to congress, praying an appropriation of a portion of said bequest, for the establishment of an Agricultural School. [Referred to Messrs. Beekman, Morris and Nott.]

The convention then adjourned to 4 o'clock, P. M. to morrow.

Assembly Chamber, Feb, 5, 1840.

Mr. Beekman, from the business committee, reported the following resolutions.

1. *Resolved*, That in the opinion of this committee, the culture of silk is an object well worthy its attention, and that a committee be appointed to report upon its present state, and what advancement has been made in it in the United States, in the last six years. [Committee Messrs. C. E. Clarke of Jefferson, and C. Bergen of Kings.]

2. *Resolved*, That this convention regard the culture of the sugar beet, with the view to the production of sugar and the feeding of stock, as a branch of agriculture that may be rendered very profitable to the farmer, and that a committee be appointed to ascertain what advances, if any, have been made in the culture of the beet and the making of sugar therefrom, in the United States, and how far it may enter into competition, with other vegetables or grains, in the feeding of stock. [Committee, Messrs. J. B. Nott and Wendell.]

3. *Resolved*, That this convention cause a committee to be appointed, whose duty it shall be to report at a subsequent meeting, if any, and what improvements have been made in the last twenty years in the management of farms, and if so, to what extent it has added to the resources of the state, or the wealth, respectability, intelligence, and comfort of our population. [Committee, Messrs. Beekman and Van Bergen.]

4. *Resolved*, That a committee be appointed to inquire into and report upon the particular method of farming adopted in some of the best cultivated counties of this state, and how far that methed would be applicable to other portions of the state. [Committee, Messrs. Viele and Knickerbacker.]

Whereas, doubts have arisen in the minds of some as to whether there has been any improvement in farming in the last twenty years, and if there has, that it has been owing to natural causes, and not to the advancement of the art; therefore,

5. *Resolved*, That a committee be appointed, whose duty it shall be to investigate this subject, and to report what would now be the profits and value of two farms, (say of 100 acres each,) the one cultivated under the present, and the other under the old system. [Commitee, Messrs. Gaylord and Bement.]

6. *Resolved*, That this convention would respectfully urge upon the public, and especially farmers, the great practical utility of reading agricultural papers, as it would add much to their usefulness as farmers and their intelligence as citizens.

The convention then took a recess to hear Mr. Van Bergen's Address, and Professor Dean's Eulogy before the State Agricultural Society, after which it adjourned to 7 o'clock in the evening.

Assembly Chamber, 7 o'clock, P. M.

The preceding resolutions, from the business committee, from 1 to 6, were severally taken up, and after discussion, adopted, and the several committees annexed to each, appointed.

On motion of Mr. A. Walsh,

Resolved, That a committee be appointed to prepare and present a petition, on the part of this convention, to the Legislature now in session, for

a law to organise a Board of Agriculture, to consist of eight members, one from each Senate District, with an appropriation of $5,000, for the use of such Board, to be expended in such manner as it may deem most likely to advance the interests of agriculture.

Messrs. Duane, Walsh, Van Bergen, Beekman and Tucker, were appointed a committee to memorialize the Legislature, pursuant to the above resolution.

On motion of Mr. C. Bergen, of Kings,

Resolved, That as numerous and incontrovertible evidence has been given the past year, of the practicability in this country to produce silk, to a great and advantageous extent, as evidenced by exhibitions at the American Institute, in the city of New-York, as well as elsewhere; and as the importations for the *past*, in that article, clearly exhibit that it is one of the greatest drains of our wealth and probably the greatest means of extracting specie from our country—and as it is highly important for the American people to prevent these evils, it is therefore recommended that some action should be had by the Legislature now in session, to do something more effectually to encourage the production of this elegant article, either by directly offering a proper stimulus to exertion, or by passing resolutions requesting congress to impose suitable duties, that will afford ample protection to those engaged in this branch of agriculture.

Resolved, That as the American Institute, of the city of New-York, has, ever since its existence, greatly evinced its usefulness and benefits to the interest of agriculture, as well as to mechanical skill and the arts, it is therefore recommended that this convention respectfully suggest to the Legislature the propriety of making, at least, a small appropriation to that very useful institution—without which its existence must either be abandoned, or its benefits and usefulness very much diminished.

Mr. Morris, of Westchester, from the committee to whom was referred the resolution relative to the Smithsonian bequest, reported the following resolution, which was adopted:

Resolved, That a committee be appointed to procure the passage of a resolution by the senate and assembly of this state, requesting congress to appropriate a portion of the Smithsonian bequest to the establishment of an agricultural school, in the city of Washington.

Messrs. J. B. Nott and C. E. Clarke, were appointed said committee.

Mr. Bergen, of Kings, offered the following resolution, which was adopted, and Messrs. T. B. Wakeman of New-York, C. Bergen and Gen. Johnson of Kings, P. Potter of Dutchess J. J. Viele of Rensselaer, and A. Van Bergen of Greene were appointed a committee to prepare the report,

Resolved, That a committee of six be appointed to prepare a report on the future prospects of agriculture, manufactures and the mechanic arts of this state, to be illustrated by such statistics as the committee may deem appropriate, and that the report, when completed, be published in the Cultivator and the Journal of the American Institute.

THE EXTIRPATION OF WEEDS.

From the Cultivator.

It may be doubted if any branch of agriculture, is more indifferently conducted in this land, than the *extirpation of weeds*. In the corn field and in the potato patch indeed, the hoe may perform its part tolerably well; and in the summer fallow, the plough turns over and smothers these noxious incumbrances; but traces of that vigilance which should mark their first encroachment, and of that perseverance which should return to its task till the work of destruction is completed—are too rare amongst us. How many honorable exceptions to this charge of negligence, can be found on a hundred adjoining farms? We put this question without rigidly insisting on the rule, that "good farmers suffer nothing to grow but their crops."

Let a careful observer traverse the country in summer, and he will find, in many places, the *St. John's wort* extending its yellow bloom over the fields and meadows without one effort to check its progress. *Here* the *wild teasel* is slowly advancing without interruption from the road side into the pastures; and *there* the sulphur blossoms of the *field mustard* amongst the oats and barley, show it already in possession, far and wide. The *quitch grass*, the *dock*, the *ox-eye daisy*, the *horse-thistle*, the *mullein*, the *milk weed*, the *yarrow*, and others of less importance—if they do not, like a neighbor's pigs and geese, devour the pasture, at least they occupy the space where grass ought to grow, and rob it of the nutriment which ought to increase its growth. We are mistaken, if more loss is not sustained from vegetable, then from animal, intruders.

The above list is long, but we have not yet done. The *burdoc*, the *tory weed*, and the *cockle bur*, are most injurious to wool; and the *stein kraut*, (red root, or pigeon weed,) and *biennial chamomile* seem to poison the growing wheat. The two last of those weeds come in so slily, or rather without observation, that the farmer is sometimes taken by surprise when he beholds the ruin of his crop.

There is one weed, however, so formidable, that all others, bad as they are, seem to shrink into insignificance before it. This is the Canada thistle —"the cursed thistle" of England, and if any plant can deserve such a name, this is the one. It is in a fair way to cost us more than the Florida war—but description would be useless to those who have marked its progress in spreading over the fields, or whose fingers have been pricked by it when securing their crops.

The Canada thistle effected a lodgement in this town, more than 35 years ago; but its progress within the last five years has been more rapid than at any former period. Fields that had not been previously encumbered with it, have had of late so many new seedlings, that the land is rendered almost unfit to be sown with wheat; and without much perseverance it will be entirely so in a few years.

In pastures and meadows, indeed, the progress of this thistle is comparatively slow, being checked by the grass and the compactness of the soil; but when the ground has been ploughed for oats, spring wheat, and barley, or even for a summer fallow, if not more than three times it spreads out in every direction; and a patch, that might be covered with

a sieve, in one or two years, will increase to several rods in diameter. Into these circles, if the growth is rank, many farmers are unwilling to enter, leaving the crop as well as the thistles to stand undisturbed.

Now, what are we to do? becomes a very important question. In answering it, we should say that the farmer ought to be watchful in passing over his fields, both before and after ploughing, so as to mark every new patch that appears; and then, without the delay of a single week, he ought to *dose* the root of every separate stem with strong brine. A dry day is the best for this purpose. We have generally made a hole large enough to hold a gill or more, with the corner of a hoe, cutting the stem as far down as that instrument reaches. When we have used old brine, one application has always been enough to destroy them; and in this way, *taking them in time*, a little attention, and a little labor, would prevent great damage.

If the patch, however, has become too large to be treated in this way, its further progress may be checked by applying brine in the manner proposed, to all such as stand near the circumference.

It should be remembered, however, that most of these patches consist of a single plant with many stems, unless broken by the plough; and that we cannot destroy them unless we attack the whole. If, therefore, they are protected by fences or other obstructions, these ought to be removed; and then by perseverance and frequency in either ploughing or hoeing, their destruction may always be accomplished,—sometimes in one, but in two without failure. D. T.

Cayuga Co. 1 *mo.* 30, 1840.

THE CULTURE OF MANGEL WURTZEL AND SUGAR BEET, FOR STOCK. BY WM. GARBUTT, OF WHEATLAND.

From the New Genesee Farmer.

It is known to many of our readers, that Mr. Wm. Garbutt was one of the first who commenced the culture of the mangel wurtzel in this section of country. And while president of the Monroe County Agricultural Society, he did much to introduce that practice of root cultivation, which is now found so advantageous to farmers throughout the Genesee country. Mr. Garbutt has an extensive wheat farm, and keeps a good assortment of stock. He grows large quantities of roots, and considers this crop of great importance to the wheat farmer, as it enables him to till more land, and keep a larger amount of stock at the same time, to better advantage than he could possibly do otherwise. Mr. G. has kindly furnished us with the results of his long experience in the culture of mangel wurtzel, which we are happy to lay before our readers.

It should be kept in mind, that the culture of sugar beets is in all respects the same as that of mangel wurtzel.—Eds. N. G. Fr.

The proper soil and preparation.

I consider a rather heavy loam, with an open gravelly bottom, the best of all soils for mangel wurtzel or sugar beets. I had rather it would incline to clay than sand. Strong wheat soil, such as is too heavy for corn, if it has not a hard bottom, so as to retain too much wet, will do well for this crop, if sufficiently enriched. Some will suppose that such land will be too apt to bake and become hard in summer, but that is easily prevented by proper manuring and after tillage. Many persons fail in their root crops from want of a proper selection of soil, or rather from not adapting the crop to the soil. The ruta baga carrot will not flourish on a heavy soil, but require a sandy loam; while the English turnips delight in new land or a low mucky soil, such as is too cool and wet for other roots.

It is very important that the ground for mangel wurtzel be not only of the right kind, but in the best possible condition—well enriched and free from weeds. The previous crop, therefore should be some hoed crop, as potatoes or corn which should be well manured and kept free from weeds. In preparing the ground for mangel wurtzel, I would recommend that a good thick dressing of well rotted manure be spread on and ploughed under in the fall. The quantity of manure should of course depend on the richness of the soil, but, I would say, be sure and *give enough*—the crop will repay, with interest. There is little danger of this crop suffering from over manuring. I prefer ploughing the land in the fall, because it is desirable to plant early in the spring, and by exposing it thus to the frost during winter, it will be in much better condition in the spring.

About the first of May, which is usually as soon as the ground will work pleasantly, when not so wet as to clog, nor so dry as the lumpy, I prepare it for the seed. If the ground be manured and ploughed in the fall, I only give one good ploughing in the spring, with thorough harrowing (and if at all dry and lumpy, *rolling* and harrowing) until fine and mellow. If the ground be not made fine and in good order, it is difficult sowing, and the seed will not vegetate well.

I prefer ridging the land for mangel wurtzel, although some persons contend that it exposes the roots too much to the effects of drought. But if the ground be frequently stirred and kept from weeds there is little danger of the crop suffering from this cause. Whereas, by ridging the ground, the roots have a greater depth of warm rich earth, and with me always succeeded better than on a flat surface. I form the ridge by going through and back with a light plough. The ridges should be two and a half or three feet apart, so as to allow room for a horse to go between the rows. If the tops of the ridges are not smooth and mellow, it will be an advantage to go over them lightly, with a rake, by hand, before opening the drills.

Preparing the seed, and sowing.

The quantity of seed required for an acre is about three pounds. I had rather sow more than less, as it is easy to thin them out, and the cost of seed is nothing in comparison with the value of the crop. Much complaint is sometimes made of mangel wurtzel and sugar beet seed failing to grow. These seeds are not quite as sure of vegetating as some kinds; still, if rightly prepared, and sown when the ground is in good condition, before the weather becomes too dry, they will very seldom fail of growing. The seed should always be *soaked* in soft water, standing in a warm place, *for three or four days* before sowing. The shell of the seed is very hard, and requires a long time soaking for it to become softened so that the

germ can burst it open. I have sometimes known it to fail after being soaked, owing to late sowing and dry weather; but I have never known it fail from excess of moisture, even though soaked a a number of days before sowing, and followed by long rains afterwards. My experience is decidedly in favor of early sowing. I prefer to sow as early as the first of May, if possible, and had rather sow a week or two earlier, than later.

When every thing is ready for sowing, I pour off the water from the seed, and roll it in white plaster, (slacked lime or flour will answer,) so as to give it a white appearance, in order that it may be more easily seen on the ground in sowing.

I have never found a machine or drill harrow with which I could sow the seed to my liking. My method is as follows:—I constructed a machine for opening the drills, to be drawn by a horse. Take a piece of scantling, about 4 feet long, and 3 or 4 inches thick, in which place two thills or shafts for the horse, and two handles to hold by, like a small horse-rake; but instead of a number of teeth, only place one peg, or tooth, about one foot long, on the under side, within about a foot of the right hand end of the beam, so that when the horse walks in the furrow between the ridges, the tooth will come on the top of the right hand ridge, by passing along which it will open a drill for the seed. The machine can be easily guided, and the drills may thus be all prepared in a very short time. If the patch to be planted be small, of course the drills can be made by hand, with a hoe or stick. They should be about two inches deep, or so that the seed will be at least an inch deep when covered over smoothly. I sow the seeds by hand, scattering them along the drills, about two inches apart. This can be done very regularly and rapidly after a little practice. The seed should be sown as soon as possible after the drills are opened, and covered over immediately after being sown. Cover with a hoe or rake, so as to leave the ridges smooth, and the work is completed.

After culture—hoeing, thinning, transplanting, &c.

The seed does not vegetate very quickly, and if the weather is cold, it will be several weeks after sowing, before the plants are all fairly visible. In most cases, two or three plants will come up from one seed or capsule; and as soon as they are all plainly visible, I go over them and pull out the extra plants, leaving only one in a place, about two inches apart. If this is not done early, and they are allowed to grow together until they are of any considerable size, they retard each other's growth, and cannot be separated without injury. If young weeds have sprung up, they should be destroyed by a light hoeing at the time of the first thinning. In about two weeks, or as soon as the plants begin to accquire some strength, and weeds begin to appear, I go over them again with the hoe, and at this time pull out about half of the plants, leaving them four inches apart. I also go through between the rows with a horse and shovel-plough, (a common small plough or a narrow cultivator will answer,) in order to stir the earth and keep it loose, as well as to assist in hoeing and killing weeds.

If any vacancies occur in the rows, they may be filled by transplanting; observing to take the plants up without injuring the roots, and set them straight and firmly in the ground. I have sometimes transplanted large numbers, but they seldom do as well as those which grow where sown. The young plants are not very liable to be destroyed by insects. Mine are never injured by the fly or any insect except the black grub, or cut worm, which sometimes thins them out for me not quite to my liking, and I have to fill up the vacancies by transplanting.

As soon as the plants acquire sufficient size, we begin to use them as greens for the table, thinning them out of the rows as desired. They are much esteemed for this purpose by my family and hired men, and during harvest we use large quantities of them with great advantage and satisfaction. The roots are very good for the table when young, but they become rather course as they grow old.

Reserving a sufficient quantity for table use, the remainder of the plants should be thinned out at the third time of hoeing, to the distance of ten or twelve inches apart. Care should be taken to keep the ground free from weeds; and if the soil is heavy and inclined to become hard, it should be frequently stirred by going through with a horse and plough, or cultivator. This is particularly necessary after rains, before the ground becomes dry. I consider frequent hoeing and stirring the soil, with liberal manuring, the great requisites of successful beet culture. Some persons may suppose, from reading these directions, that the culture of this crop is laborious and difficult; but such is not the case; at any rate I do not know of any crop which better repays for the labor bestowed on it than this. The quantity and value of the produce is so great, in comparison with the amount of land and labor required, that he who neglects, or only half cultivates this crop, in my opinion, practices very poor economy.

Harvesting and preserving the crop.

Slight early frosts do not injure this crop, the harvesting may therefore be deferred until severe frosts are expected, which is usually about the middle or latter part of October. Some persons recommend stripping the leaves and feeding them to cows, &c. before the time of harvesting. But I consider this practice dicidedly injurious, as it not only stops the growth of the roots, but exposes them to injury from frost. If any are wanted for feeding before they have done growing, the best way is to pull them out where they stand too thick; or, if their growth is completed, they may be pulled up clean where most convenient.

My manner of harvesting is as follows:—I pull up four or five rows and throw them together in one row; then go between with a wagon and load them on to it, and draw them to the barn, where the tops are cut off, and the roots put into the cellar under the barn. I consider the tops of great value for feeding cows and other cattle; and if thrown into a shed or barn they will keep good for feeding several weeks. Those who have no proper cellars, may preserve the roots in pits in the field. They are not as liable to injure by heating as turnips or carrots, and if too large a quantity are not put in one heap, they will be in no danger from this source. The best way to bury all such roots, is to make the pit long and narrow, and pile the roots up pretty high. Beets are not so easily injured by freezing as potatoes, and need not be covered

more than about half as deeply with earth. The end of the pit may be closed with a few bundles of straw, so as to have easy access to the roots when desired.

Amount of produce, feeding, &c.

Not having taken particular pains to weigh or measure my crops, I cannot say exactly what the amount of produce is per acre. But judging from the number and weight of the loads, and the space which the roots occupy, I should think that I obtained, upon an average, about twenty-five tons from an acre. I this year raised three acres, and harvested one hundred and two large loads of about a ton weight; one-fifth of which we calculated for tops.

I feed the roots to all kinds of farm stock, except horses. For milch cows, fatting cattle, hogs and sheep, I find them of great advantage. Some animals will not eat them freely at first, but they soon learn to eat them readily. I let them first get well hungry, then cut a few roots and sprinkle on them a little bran and salt. My horses alone do not seem to fancy them. They prefer carrots instead, and if worked hard, want a few oats in the bargain. I feed my milch cows half a bushel of mangel wurtzel each per day, with hay. They keep in good condition, and give milk freely all the winter. Fatting cattle require a bushel or over per day. They thrive and fatten finely on them. For working oxen I think they are superior to any other food, especially when worked hard in the spring, and during hot weather in summer; as they will do more work, and bear heat better than with any other food. The roots can be kept through the summer if desired.) I keep my store hogs on them almost exclusively during the winter, and they thrive admirably. With the addition of a little corn, hogs fed on these roots will fatten rapidly and make good pork. Sheep also do extremely well on them; and they are superior to all other food for feeding ewes at lambing time in the spring. I keep 130 ewes, and find them greatly benefited by this practice. For sheep and hogs it is not necessary to the cut the roots, but for cattle I cut them to pieces with an axe or spade. A proper machine for the purposes would be some advantage.

I use very little hay, as my sheep and young cattle are fed only straw with the roots. They eat the straw readily without cutting, and keep in good condition. Thus by raising only two or three acres of these roots, I can devote nearly my whole farm to grain, and at the same time keep a large amount of stock, with good profit.

Wheatland, Monroe co., N. Y.

CALCAREOUS SOILS OF LOWER SOUTH CAROLINA AND GEORGIA.

From the (Ga.) Chronicle & Sentinel.

Messrs. Editors:—Having lately passed through the eastern section of the Carolinas, and in Georgia along the Savannah River, my attention was directed to some of the great mineral resources of this section of country, which appear to be entirely unappreciated by its inhabitants. I refer particularly to a great deposit of limestone which I first observed in Jones county, N. C. near the Santee, and afterwards in the western part of Charleston District, S. C., and again on the Edisto, and in Georgia at Jacksonboro, where there is now a small kiln, not at present however in use. The purity of this rock, which approaches that of chalk, renders it admirably adapted for the production of lime, and yet notwithstanding its abundance, the facility of procuring wood, it costing nothing but the labor of cutting and hauling, and the great expense of lime, Charleston and Savannah, and all the Southern coasts continue to be supplied with Thomaston lime. Were men of capital and enterprise once aware of the means they have at hand, and of the relative cost at which this article may be produced in the two sections of country, it seems hardly possible, that the South should look much longer to the North for lime, any more than, as was once the case, they did to Germany for brick!

Lime is burned at Thomaston, Me., with wood, which never costs less than $3 a cord. Fine anthracite coal has lately been introduced, and partially used as fuel, which may reduce the expense a little; but from the lowest estimates, as given in Dr. Jackson's Geological Reports of the surveys of that state, it cannot be produced at a less expense than $77 the hundred casks, which includes the price of the casks. These should hold, by law, each five bushels, but they have been found to contain less than a common flour barrel —three and a half bushels may be taken as their average capacity. The expense of transportation, &c. makes them worth at Charleston about $2 per cask, or more; and as it is carried into the interior, its value rapidly increases, till on the very spot, where the rock occurs in the greatest abundance, it has long been sold for $3 per cask!

In the Chester valley, Penn., lime is sold at the kilns for 12½ *cents per bushel.* It is burned in large kilns holding 1600 bushels, with only sixteen cords of good hard wood, which costs $2,50 per cord. Fine anthracite coal is there used also to some extent, but the lime is not afforded any cheaper than that made with wood. At Pottsville where coal is used altogether, lime costs twenty cents; the rock, however, has to be transported some twenty-five and some eighty miles.

From the slight opportunities I have had of judging, I can see no reason why lime should not be made as cheap and as abundantly in South Carolina and Georgia, as in the Chester valley. Suitable stone for making kilns may not always be found conveniently at hand, but if granite can be transported from Quincy to build churches and houses, it, or a better material may, also, to build kilns, and substantial ones made, which should last many drawings. Pine wood can every where be obtained for little or nothing. Of the relative cost of labor to effect the same end, I know nothing. But as to the quality of the lime the southern may well compete with the northern in purity and strength, though *prejudiced* workmen may for a time refuse to adopt the change, as is invariably the case with any alteration introduced in their business, which they, naturally enough, think they understand better than any one else. As an instance of this, lime made from a particular rock in Rhode Island, a magnesian carbonate of lime, is prepared at *double the price* in New York of Thomaston lime, while a precisely similar quality of lime, made from a rock, which is chemically the

same at the latter place, but which happens to be an unusual variety there, meets with no sale in New York at a very low price.

Some of those in South Carolina may not make so white a lime as the northern, but it will be equally strong and similar for mortar, and farther in the quarry it may be found purer. Very little of it, however, will be liable even to this objection. That from Jacksonboro' is remarkably white.

By opening the same bed on the Savannah river, where it must occur, with a few kilns there, and also on the navigable parts of the Santee and Edisto, a company of enterprising men, or one man with a capital, might, I believe, supply all the lime required for Charleston, Beaufort, and the whole southern coast, for half the present cost of the Thomaston lime, and afford it to the neighboring planters at a price, which would make it an object to them to use it for renewing worn out lands, and keeping up those under immediate cultivation, without their being compelled continually to clear new land, and cultivate extensive tracts for crops, which, with the aid of lime, might be produced on half the number of acres.

These observations, a traveller's notes merely, are at your service, Messrs. Editors, and if they may call attention to some of the neglected advantages of this country, it will afford me much pleasure, that I made them. J. T. H.

RED ROOT, IN CLOVER SEED.

From the New Genesee Farmer.

As the time for buying and sowing clover and grass seed is at hand, permit me to raise a warning voice, for farmers to beware of sowing foul seeds on their lands, especially that of *red root*.—

I consider this weed a much worse enemy to the wheat grower than even the Canada thistle. It has already obtained a lasting foothold on some good wheat farms in this section, to the great detriment of the crop, and, in my estimation, reduced the value of the land about one half. For, when the ground once becomes seeded with it, it is next to impossible ever to get rid of it; as the seed is produced very abundantly, and is of such an imperishable nature, that it will lie dormant in the ground for years till a favorable opportunity presents, when it will spring up and seed again most plentifully. The seed is rather larger than that of clover, of a brown color, nearly round, rough and very hard. Any person acquainted with it will readily detect it in clover or grass seed; but those who have never seen it would not be apt to observe it. MONROE.

CARROTS AS FOOD FOR HORSES.

From the New Genesee Farmer.

Mr. Geo. Sheffer, of Wheatland, called at the seed store, a few days since, and gave us some account of his success in the culture and use of roots, for stock; particularly in feeding horses on carrots. He raised last season, beside other roots, about 300 bushels of carrots, which he feeds mostly to three working horses, giving then one bushel each per day, together with hay. He has fed them in this manner nearly three months steady and kept them at work most of the time. He formerly fed his horses half a bushel of oats each per day, with hay; and from the results of his experience, he is fully convinced that one bushel of carrots is worth as much for horses as half a bushel of oats. His horses eat much less hay than when fed on grain, and keep in as good order, and appear as well able to work. He thinks that horses fed on carrots, with a small quantity of oats and hay, will do better than when fed on oats and hay only.

DIVERS THINGS.

For the Farmers' Register.

In looking over your two last numbers, I have been amused as well as instructed to see how doctors disagree, and my wonder is much excited to find that some who have railed and travelled their patient in "seven league boots," have called a halt, and propose something that is better. I wish they may succeed. My experience has taught me that the constitution of land is perpetually varying and changing as you supply it with calcareous and vegetable matter. Any vegetable matter is good; but that which has been animalized, that is, passed through the intestines of some animal, is greatly preferable. With profound respect for all clover-lay farmers, I would suggest that they cut their clover, and, if they please, throw it into their farm-yards, until it is well saturated with urine and the fluid excrement, and in that state spread it, thick or thin, give it a dressing of 30 to 50 bushels of lime, and bury with two good horses. If the land thus treated be dry, you will have better crops of corn, wheat, or clover, than the same land produced when fresh from the wood. Some land will yield better than others, and so it is of some fields; I presume for this plain reason, that they are constitutionally different. My own farm is divided into seven fields, (besides lots,) four of 60 to 70 acres are thus cropped: first, corn, wheat, or oats, then clover, clover pastured freely. Three fields are appropriated to follow thus; wheat, clover, clover or oats, wheat, clover. My corn land gets all the manure I can give it during the spring, the fallow the balance. Of those seven fields, no two are alike constituted. I selected the dry lands for corn, the wet for fallow, and I would particularly recommend this practice to young beginners, or old who have begun wrong.

It is contrary to all of nature's laws, that land filled and saturated with water should improve, or produce grain; and any application of manure, lime or plaster, is a folly as well as a loss. I will demonstrate, if I have time, that the poor land of Virginia wants nothing but lime, clover and plaster, to make it good; and if I do, then I hold I shall render greater service to my country, than all the political babblers that have lived in the last century. And by the way, sir, can you tell me of any other animal that will persevere to the death in the destruction of his own pasture, besides the politician and the hog?

Our wheat is very promising, and our clover three weeks earlier than usual. I have much to say about lime, but I will keep that for another communication. FAIRFAX.

ACCOUNT OF AN AGRICULTURAL EXCURSION INTO ST. JOHN'S, BERKLEY. BY THE EDITOR.

From the Southern Cabinet.

All of the crops grown in the state are cultivated in the parish of St. John Berkley. The lower part embraces the whole of the western branch of Cooper River, and the northern half of the eastern branch. On these two branches are some of the finest rice plantations in the state. Of their management, we do not propose to treat at present but confine our remarks to the crops grown in middle and upper St. John's. Of these, the most important is *cotton*. The variety grown here is what is known in commerce as the "Santee," an inferior kind of Sea-Island or Black Seed, which inferiority is in a great measure, if not wholly, produced by locality. We say in a great measure, for no one who has witnessed the great improvements made on the Sea-Islands in the staple of their cotton, but must be convinced that a similar improvement could be brought about wherever the same variety of cotton is grown. We do not wish to be misunderstood. We do not believe that the fineness of the staple of the Sea-Island cottons could ever be attained, by cotton grown beyond the influence of the sea atmosphere, but we think that the Santees might, by the judicious selection of seed and application of *appropriate* manures, be grown to as great fineness as the Sea-Island cottons were before the recent great improvements. The reason why we suppose that the Sea-Island cottons can never be successfully rivalled in fineness is, that the peculiar atmosphere in which they are grown, is wanting as soon as we leave the coast, and this cannot, as far as our experience goes, be in any manner supplied. So great an influence was supposed to be exerted by this atmosphere, that plantations in the interior of the islands and on the main, (although bordering on tide-water,) were supposed not capable of producing the finest varieties of cotton. Experiments, however, have been made, and experience now sanctions the opinion, that the finest cottons can be grown on such, by the judicious application of saline manures, the atmosphere not being so materially changed in its transit as to affect the staple.

Prof. Shephard is now engaged in analyzing the soils of Edisto Island, at the request of the agricultural Society of St. John's Colleton. We view this as a most important step taken towards the advancement of our agriculture, and the society merit the thanks of the community for it, which we hope to see imitated by all of the agricultural societies of the south, especially of this state, and even by individuals. No one with whom we are acquainted, is better able to carry on this nice investigation than the able Professor to whom the agricultural society of St. John's Colleton have assigned it. The many advantages which would arise from an accurate analysis of of our soils, are so obvious, that we scarce feel warranted in alluding to them. We, however, cannot refrain from mentioning a few. The first is, that having ascertained the component parts of a fertile soil, and the relative proportions of each ingredient, we can by analysing our own, discover in what it is deficient, or in what it superabounds, and if practicable, apply the remedies which may bring it nearer the standard we aim at. Again, it will enable us to correct and bring into culture spots, and in some instances acres, which at present are wholly unproductive, when cultivated in particular crops. For instance—it is well known that in many fields, both on the islands and main, there are spots which produce what is called the "blue cotton," which yields nothing. Other spots are subject to the "rust,"—as soon as these are analyzed, and compared with fertile soils, their excess or deficiency, in any particular ingredient, will at once be detected, and the remedy applied. The analysis, therefore, of the first quality of Sea-Island cotton lands will at once establish a standard, by which all on which are grown the same varieties of cotton can be judged. The same benefits will result from analyzing on the soils in which other crops are cultivated. But will the analysis of the soils of Edisto Island benefit our friends of St. John's Berkley, or elsewhere?—much, for they will, by it, become acquainted with the component parts of the best soils for growing Sea-Island cottons in, and by analyzing their own they can at once ascertain the difference, and how near, by admixtures, or application of manures, they can approximate. But to return to the culture of cotton in St. John's Berkley.

The soil of Middle St. Johns is a light loam, while that of Upper St. John's is so light, that it may almost be termed sandy. It is seldom that a field, selected for cotton in this parish, is cultivated in any other crop. The selection being generally made on account of the supposed adaptation of the soil to this particular plant, or the locality of the field. Small fields are sometimes alternated, but the large scarce ever. All of the crops, however, (cotton, corn, and potatoes,) are planted in lands 4 feet apart, so that whenever any change is made in the culture of a field, the labor of preparation is not increased, by having to level down and re-form new beds at an altered distance. As soon as the crop has been ginned, preparation is made for planting, and each planter endeavors to have his fields ready by the 25th of March. Most of the planters adopt the plan of placing the manure under the list, or rather they strew it between the rows, and then form a list which of course mixes the manure, cotton stalks, weeds, grasses, and earth (forming the list) well together. A very small bed is made on this, which is gradually increased in width, (but not height,) at each working. Some, however, prefer to make the bed at once of the size intended, and endeavor to keep it thus throughout the season. The hoe in this and the subsequent operations is the principal instrument used. The plough, if used at all, is only employed to break up the alleys. Formerly the "skimmer" was much used, but from some cause which I could not learn, it has been laid aside. From the 20th March to 1st April, the crop is planted. The holes are not made as formerly, by the hoe, but by what is here termed a dibble; made from a $2\frac{1}{2}$ inch plank, 6 inches wide and tapered to a half inch, at the bottom, whilst the upper part is formed into a handle. Across this, a groove is cut diagonally, into which a lath or thin piece of board is fixed, which can be readily adjusted to different distances, and is of such length as to touch the ground when the dibble is struck into the bed, and marks the spot where the next hole is to be made. The usual distance is from 20 to 24 inches, and it is supposed that two hours

is gained by using the dibble in place of the hoe. The thinning commences at the second working, is continued at the subsequent and completed, by the time the plants are six inches high—one stalk only being left in each hole. Of course each planter endeavors to keep his fields as clear of grass as possible, and hoes as often as he can, which however is seldom more than five times. The crop is usually laid by, from the 20th to the 25th July—but we find that the opinion of some of the best planters, is in favor of laying it by, by the 1st of July, even though it be a little grassy; working it later, they think, increases the growth and prevents the pods from maturing. In hoeing some increase the size of their beds, gradually, whilst others are careful so to perform this operation that no new surface is exposed, by which they have less grass to contend with, as nearly all within germinating distance springs up and is destroyed in the first workings. As soon as from 15 to 20 lbs. can be picked, (which is usually by the first week in September,) some hands are sent in; no task is given in picking cotton, though they generally average from 90 to 100 lbs. when the pods are well open. Three of Dr. Ravenel's negroes, last fall, picked in September 136, 140, and 142 lbs. each. The cotton is spread out in the field as it is picked, and the next day on the scaffold. It is then housed until wanted for the gin, when it is passed through the whipper to free it from dirt, and this operation is repeated after it is ginned, to clear it of broken seeds. Some of the planters sort and pick their cotton before it passes through the gin which renders the labor of moting it much less. Generally, however, nothing is done to the cotton until it has been ginned, which operation is mostly done in this parish by the foot gin—on some plantations, in conjunction with Farries' gin worked by horse power, which is considered the best yet used, and gets out from 250 to 300 lbs. per diem. The average product in this parish does not exceed 100 lbs. per acre, except when manured; the average on manured land is supposed to be 150 lbs. Upwards of 250 lbs. have been made on sixty acres.

We have, in the above, given the outline of the culture as practised in this parish, and will now notice a few particulars more in detail. We have stated that no rotation is followed, and one of the strongest reasons assigned, (and one not readily got over) is, that the three principal crops (cotton, corn and potatoes) are cultivated in such unequal quantities, that a rotation with these is out of the question, and no other crops at present offer sufficient inducements. But although no rotation at present can be established, yet the crops grown on some of the small fields are at times alternated. It has been found that cotton and corn can be cultivated, by the aid of manure, for an indefinite period, on the same soil, without diminution of product, yet potatoes cannot, no matter what quantities of manures may be applied. Corn succeeds, as is well known, admirably after potatoes; but for years it was believed that cotton could not be successfully grown. This, however, was an error which is now happily corrected. It only requires, as Major Porcher has fully ascertained, that the ground be bedded up, very early, (say in January) so that the beds may consolidate, as the cause of the cotton's dying appears to be connected with the looseness of the soil; the more compact the bed is the better will be the "stands," and the sooner it reaches the hard earth under the bed, the sooner will it grow off. Hence the reason for small beds. This is directly at variance with the practice pursued on the Sea Islands, but of their culture we hope hereafter to give some interesting details, and will not here enter into any comparison.

Many experiments were related to us, going to show that corn and cotton may be grown for years consecutively on the same field, without deterioration or diminution, when proper quantities of manures have been applied; in fact, that old fields have been actually restored to what is supposed to have been their original fertility. Several were mentioned to us, but we do not find the quantities of cotton stated but in three instances, one a field at Mexico, (Major Porcher's) which has been cultivated without rest, since 1801, and seldom planted in any other crop than cotton, yielding the last year 176 lbs. per acre. The other is the field of Mr. Thomas W. Porcher, already alluded to, which produced 170 lbs. per acre. Dr. Ravenel's fields, which have been in the culture of cotton for years, have also materially improved, the average, the last year, being 150 lbs. per acre. The manure most relied on, and the only one in fact which has been used in any quantities, is the compost, made, as we have already stated, by hauling into the stables, cow, hog and sheep pens, the leaves gathered in the woods, where they remain until spring and are then carted out. Of this, from 250 to 300 bushel baskets full, are considered sufficient for an acre of cotton. Plaster of Paris has been used with decided effect by Mr. H. W. Ravenel and Mr. S. G. Deveaux, but unfortunately the experiments have not been repeated, and were not made with that accuracy which enables us to judge of its relative value. We hope, however, to have the pleasure of giving to our readers some further experiments with plaster hereafter. Various other manures have been tried; such as swamp mud, fowl dung, cotton seed, &c. We conversed with no one who had experimented with the first, but understood that it was but little used, it not having been generally found beneficial. Perhaps this has been owing to its having been taken fresh from the swamp, and applied to the crop. All the experiments we have ever made with swamp mud, went to prove that it could not be advantageously used unless it had been exposed for some time to the action of the atmosphere, or was corrected by the admixture of lime. We would suggest to our friends of St. John's, (especially the upper part, where the soil is so very light,) whether a most excellent imitation of marsh mud, which has been found of such immense benefit to the cotton crops of the Sea Islands, could not be made by adding to the mud taken from the swamps, a small quantity of lime or marl and of salt, the latter perhaps in the greatest proportion. We hope some of the planters will make some small experiments with a manure thus formed. The benefit, we think, will not be confined to the productiveness but extend to the quality also. Fowl manure cannot be obtained in any very large quantities, but as *very little* manures a large space, it is also applied to the cotton and with great effect. Cotton seed is chiefly reserved for the corn. When used for cotton, it creates too luxuriant a growth, and the pods are late in open-

ıng. Several experiments have been made with ıime and salt, but these generally have been so ıoosely made, that nothing definite beyond the ıact that they were beneficial, could be gathered rom them. Mr. Frederick A. Porcher, of Somerton, has made greater use of these two manures than any other planter in St. John's, and has kindly furnished us with an account of his operation with both, and which being interesting, we give in full.

"In 1839, I applied to a small field of cotton, limestone in the proportion of sixty four bushels to the acre. The soil was originally a good loam, of the quality indicated by the growth of oak and hickory. This, I presume, from its contiguity to two large swamps, and from the growth of the forest land in the neighborhood. I do not know when the land was cleared, but it must have been a great many years since. It had obviously been subjected to a long course of exhausting cultivation. When I first took it in, it was covered with the broom grass. A crop of slips I believe was the first step taken towards reducing it to cultivation, and this was followed, every alternate year, with a crop of cotton. During the alternate years it rested—manure was freely given. The first crop, that of 1835, was almost a total failure—that of 1837, promised better, but it did not yield more than 75 lbs. of clean cotton per acre. Perhaps it shared the fate of other crops on lands of a better reputation, the autumn of 1837 having been peculiarly unfavorable to the maturity of the cotton. The products of the field from the crop of 1839, is, as well as I can judge, a fraction below 150 per acre.

"The lime used was procured from the margin of a creek on the plantation. It lies about six feet below the surface of the highland. It is of various appearance—some of it being so hard that it is with difficulty broken by the pick axe, while others crumble with the application of very little force. Fossil remains abound throughout the strata, but more in the loose masses than in those more compact and hard. I have reduced all to quick-lime in the kiln, and have found it quite available for mortar.*

"The lime applied to the land was broken with a hammer, a very toilsome operation, and in that way applied. The field is laid off in square half acres, and contains, in each acre, sixty rows, each 150 feet in length. To each of these rows a bushel of the pounded lime was applied on the list. The land was manured as usual. The quantity of manure applied I do not recollect; I am sure it did not exceed sixteen horse cart-loads to the acre.

"I left the plantation in May, before the lime had had any time to develope its agency, and did not return until October. In June, my overseer wrote me that he could not perceive the action of the lime, except perhaps in the increased vigor of the growth of the joint and nut grasses with which the field is infested. Some time in July, he wrote that the limed cotton was improving rapidly, and recommended its application to every acre of cotton which should be planted. The lime did not cover the whole field, the part not limed is of a character more congenial to cotton than the other. The lime gave out in the middle of a pond. In this pond I doubled the quantity, and instead of one bushel put two, that is, at the rate of a hundred and twenty bushels to the acre. Here the success of the experiment was striking. The pond, as far as the lime went, had a luxuriant growth of productive cotton on it, whilst on the rest a few poor stalks, here and there, alone indicated the presence of cultivation. No pains were taken to separate the product of the limed part from the rest.

"The application of wood ashes to a hitherto unproductive pond, in the quantity of a peck to the row, or from fifteen to twenty bushels to the acre, was attended with the same, or even more striking results.

"My brother, in 1836, manured some of his lands with shell lime, bought in Charleston—the quantity applied was a peck to the half acre row, or 19½ bushels to the acre. The land was planted in 1836, 1838, and 1839, in cotton. The first year no effect was observed—an improvement was perceptible in 1838, and markedly so in 1839. The soil was a poor clay loam. The lime was slacked when applied. His experiments with ashes, in the quantity mentioned above, were all eminently successful.

"Salt was used on my plantation in 1836 and 1837. The first year its successful results was most stikingly manifest. A field of sixty acres, lying on the edge of Bigen Swamp, had been treated in the following manner: part of it, say 30 acres, was cleared and planted in cotton in 1832; the crop of cotton was continued without intermission every year. In 1834 and 1835, the remaining 30 acres were cleared and planted with cotton. In 1836, the whole field of sixty acres presented portions which had been one, two, and four years under cultivation. No doubt was entertained of the propriety of planting the two first portions, but it was thought advisable to give the third portion a dressing with manure. Accordingly a quantity of compost was prepared, and about thirty bushels of salt, or a bushel per acre, thrown upon it. This was spread upon the land, and this part, then under cultivation without intermission for five years, yielded a greater quantity per acre than the rest of the field, which was much more fresh. The difference was perceptible to the eye. I sold upwards of one hundred and fifty weight of cotton per acre from this field, at a price higher than any Santee cotton at that time in Charleston brought, *except cotton raised under the same treatment.* This experiment was made under the direction of my brother, the late Dr. J. P. Porcher, who superintended my plantation during my absence from the state.

"The use of salt was repeated in 1837, but without any marked result. In no case was there such a favorable opportuninty of comparison, as in the preceding year. The cotton crop was a bad one. One great use of salt as a manure for cotton, seems to be the quality which it imparts to the plants of holding the fruit which it bears. I do not know whether it stimulates and promotes production, but it certainly appears to act as a conservative to the product. Such was its only apparent agency in the successful experiment of 1836. My brother continued the use of salt, and the result of his cropping has shown that he did not exaggerate its value."

Mr. Porcher, intends making considerable use of both the lime and salt. When we had the pleasure of visiting Somerton last we found large

* Prof. Shephard has kindly promised us an analysis of this limestone.

quantities of the rock, got out for the purpose of being converted into lime, and we understood from him, that he had purchased a considerable quantity of salt to be used as manure. One fact we would call the attention of our planters to, and that is that the *cotton, manured with salt*, brought a higher price than any other from the same neighborhood, sold at the time. Is it not worthy of inquiry and experiment, whether salt, added to other manures, (or alone) does not produce a finer staple independent of its effects in other respects? In a small pamphlet, published some few years since by Mr. Johnson, he enumerates the benefits to be derived from the use of salt to be—

"1st. By *promoting* in *small* proportions, putrefaction. 2d. By destroying weeds, grubs, &c. 3d. As a constituent or direct food. 4th. According to Drs. Darwin and Priestley, as a stimulant to the absorbent vessels of plants. 5th. By preventing injury from sudden transition in the temperature of the atmosphere; and 6th. By keeping the soil moist."

Corn.—There is nothing peculiar in the culture of this crop, unless it be in the great attention bestowed on manuring it. The preparation of the land is similar to that for cotton; the manure, which most generally is compost, is strewed (by some at the rate of 250 bushel baskets full per acre) in the alleys, and a heavy list made, on which the corn is planted, and not on beds, as when planted on beds, the stalks are two easily blown down. Cotton seed is invariably used as a manure for this crop, and is supposed to cause the greatest yield. Many planters apply it in the hill at the rate of a pint to each. Others reserve it until all danger of frosts is over, and apply it around the corn, and cover it with the hoe at the first working. By Mr. T. W. Porcher, it is placed at the sides only, which enables him to bury it when it sprouts, much more easily than by the usual mode of crushing with the foot and then covering it. When it is up, he sends ploughs into the field, and a fellow goes ahead of each with a spade and places it close to the corn, and between it and the sprouted cotton seed—the earth thrown by the plough completely covers the latter, while the corn is untouched. In this manner, he accomplishes much more than those who follow the old plan. In working it, most of the planters make but little use of the plough, and the reason assigned is the fear of spreading the nut grass, which has already become a source of great annoyance. A plan adopted by Messrs. Thos. Porcher, of White Hall, R. W. Ravenel, and perhaps others, is to work only every alternate alley at each time of going over, by which course of culture the roots of only one side are cut at a time; moreover a fresh stimulus is applied to the plants more frequently, by the stirring of the ground. They speak very favorably of this plan.

The average product of this crop in St. John's, is from 10 to 12 bushels. Dr. Ravenel usually averages about 22 bushels, and this on fields which are perhaps the oldest on his plantation, (itself among the oldest in the Parish.) These were very much reduced when he took possession, but by manuring highly, he has restored them to their present state of fertility. The Baden corn has been cultivated in small quantities by a large number of the planters, and universally condemned. It is found not to answer in our climate. The product is not much greater than that of our flint, the grain very inferior, it is very easily blown down, is subject to rot if left until the usual time of harvest in the field, and when gathered in, is more liable to the attacks of the weevils. For these reasons, we believe but little of it will hereafter be planted.

THE CURCULIO.

From the New England Farmer.

Southborough, Feb. 22, 1840.

Dear sir,—I received a letter a few days since from you, desiring some information in protecting the fruit of plum trees from the depredations of the curculio. I have not stationed a hen and chickens around a tree since the spring of 1837, because they would injure other productions which were near the trees; but I should think from what I know of the habits of the curculio, that they would prove quite a prevention. I have studied the habits and character of the curculio in the two last summers, for I consider him the only obstacle in the way of raising that fruit.

1st. I have found that the curculio is on the tree ready for its operations very early, even before the plums are large enough for it to deposit its egg in them.

2d. It continues its labors into August.

3d. It gets on to the tree by flying, though it may crawl up the body at times.

4th. It stings the fruit mostly in the night.

The same curculio that stings the plum and peach I have found repeatedly operating on the apple. I was not aware of this fact till lately, and I do not know but there may be a larger species of the same insect which stings the apple also. I should think they were from the size of the larvæ often seen in apples. I should consider hens with their chickens stationed about the fruit trees, and daily shaking and jarring the trees (for the curculio always falls to the ground when the tree is shook) while the fowls were immediately under them, to prove quite a protection. The supposed remedy should be applied quite early in the spring, in order to warrant the greatest chance of success. The small birds are the natural enemy of this insect as well as most of the insect tribe, and it should be the aim of horticulturists and farmers to encourage their multiplication, and to protect them. I design to make further experiments to protect fruit trees against injuries from this insect, and should I make any discovery or advances, I shall be happy to communicate. Were it not for the curculio, most of our fruit would be comparatively fair, and all of it free from worms. A gentleman lately informed me that apples and other fruit were free from worms in the state of Ohio.

By the request of a friend, I gave the editor of the Worcester Ægis last summer a small article "on the cultivation of plums," in which the curculio is described, and some modes of prevention are spoken of in the article. I take the liberty to send you that paper, and also an imperfect drawing of that insect in this letter.

No information could be more important to the fruit grower than a knowledge of the character of the canker worm, the curculio, and the borer, and the best means of securing fruit trees against the injuries which they inflict. Respectfully, your ob't servant, JOEL BURNETT.

CULTIVATION OF THE PLUM.

From the National Ægis.

Mr. Editor: Sir—I am induced to offer you some observations of mine on the cultivation of plums. I have taken an interest in the cultivation of fruit for the last eight years, and now have several good kinds in a bearing state. The plum is one of our hardiest fruit trees. During our cold winters I lost pear, apricot, peach, and several of the Baldwin apple, by the severity of the cold, but not a single plum tree. Plum trees of almost all kinds are good bearers; they usually blossom full, and the fruit sets well, and it is certainly one of the most delicious fruits we have, when in perfection. The fine kinds are wholesome and salutary, and can be indulged in even to satiety, when fully ripe, without harm. They will grow well in rather a low loamy soil; if the soil is rich, they grow fast and come quick into bearing.

But the grand obstacle in the way of cultivating this fruit, is the depredations of a small insect of the beetle tribe, which commences its operations when the fruit is quite small, and continues them usually till the first of August. This beetle is called by horticulturists the curculio—is about one sixth of an inch long, has two small bunches or protuberances on its back, and a rostrum or beak, and on this two antennæ. By this rostrum it makes a semilunar incision on the plum, into which it deposits an egg. The egg hatches, producing a worm, or larvæ, which burrows down into the heart of the fruit, eating it through two or three times from end to end. This kills the life of the plum, causing it to wither and fall prematurely: the worm then soon leaves the fruit and enters the ground, where it undergoes a transformation or metamorphosis, common to the insect tribe, and then comes up a new curculio, to deposit its eggs as before described. Its work is not confined to the plum, but extends to the cherry, peach, and apple, though it would seem to prefer the plum to other fruit, on account, probably, of the smoothness of the skin, and the greater ease in making the incision. It is remarkable how general its depredations are on the plum tree when unmolested; for when the tree is loaded with fruit, and large, scarcely a single plum will remain unpunctured, and consequently all will be lost to the cultivator. Some kinds of peach and apple which have a woolly or furry surface, are not attacked. Almost all the wind-fall apples (as they are called) are produced by this beetle, and upon examination will be found to contain the larvæ or worm from the egg of the curculio.

The plum tree is subject to a disease on the limbs, a kind of excrescence or warty appearance, which Dr. Harris says is caused by this same curculio, puncturing the tender bark and depositing his eggs under it. "These swellings, or warts, are diseases of the bark, caused by the punctures of the weevil, and the residence of the grubs. The sap vessels being wounded and irritated by the insects, throw out an increased quantity of fluid; this is re-absorbed by the bark, which is consequently swollen and thickened in substance; the overstretched cuticle bursts, and the swelling becomes irregular, granulated, and full of fissures."

Dr. Harris recommends cutting out and extirpating these excrescences and burning them before the last of June. The wounds made in so doing should be treated with mortar used in grafting.

The character of the curculio is shy and timorous; so much so, it is seldom seen unless hunted after purposely. He is not often seen in motion on the tree, but occasionally in a small crevice or crack, or the axilla of a limb, and so much does he resemble an old blossom or bud, or a small piece of bark, that he will commonly remain unnoticed. Should the observer extend his thumb and finger to take him, ten to one if he don't elude him, falling as imperceptible as a small shot would to the ground.

The habits of this insect are not well known, I still believe, to fruit growers. I have made frequent inquiry of them for a preventive measure. Some have told me the insect crawled up the tree, and most of them have never seen it to know it. It is well to remark that it flies on the tree.

The following are some of the means of preserving fruit against the attacks of these insects.

First. All the premature fruit that falls to the ground with the worm in it, should be immediately gathered and burned. It will begin to fall as early as the 12th or 15th of June, and continue to fall until the middle of August, if not ripe before. This course, well pursued, will destroy the next generation of them and save the next year's crop.

Second. Shaking the tree briskly morning and night, and two or three times during the day, will very much discommode and interrupt them from pursuing their operations—for at each concussion of the tree the insects fall to the ground, and if they reascend, will soon become discouraged by this course of treatment.

Third. Let two or three hands take a sheet or sheets and spread under the tree, and then shake and jar it, and they immediately fall, feigning themselves lifeless, and appearing like a shapeless lump, and by those who are unacquainted with them, would not be taken for an animal until they moved. All that falls on the sheet should be immediately crushed. This last mode of destroying them should be practised twice a day while any are found. In the spring of 1837, I cooped a hen and chickens about an imperial gage, whose fruit was destroyed the preceding year, and about all the plums matured on this tree. It is probable that the beetles were destroyed by the brood, as they made their way to the surface of the soil. As this little animal is easily annoyed, trees standing before a store or shop or any frequented place. usually more or less escape injury. I have known trees standing near a hog pen mature their fruit year after year, while others, standing four rods distant, as surely failed.

Mr. Manning remarks in his book of fruits that plums thrive best near the borders of the sea, and, that the curculio is said to avoid the salt air.

If the foregoing remarks should prove of any advantage to horticulturists in the protection of fruit from injuries inflicted by this insect, or lead to minuter investigation into its nature and habits, I shall be well rewarded for this imperfect communication.

JOEL BURNETT.

Southborough, June 19, 1839.

THE FIVE-FIELD ROTATION AND GRAZING.

To the Editor of the Farmers' Register.

I have been highly gratified in reading the three very able pieces in the February number of the Farmers' Register, under the signatures of Rivanna, R., and my friend C. Braxton. The gentleman under the signature of R. has misunderstood me somewhat in my communication in the December number of your Register. He says, "to deprive the land of this (clover) its only recuperative crop, when it is required to bear three exhausting crops in succession, would be to induce sterility without giving check to the evil complained of," (insects,) &c.; but I do not think the fifth year's grazing will have that effect. My idea is, that the grazing year will be a year of rest as well as the fourth year, when the clover is allowed to remain on the ground, though not to the same extent; for I think that after the clover remains the fourth year on the ground, the grazing the fifth year will do no injury to the land, and yet check the insects. The land will be restored by the fourth year of clover, as I have heretofore had it, under the four-field system, and certainly not injured under the fifth year's grazing; for the grazing of good land with tolerably fat stock, (and the land to have fat stock must not be grazed to great excess, otherwise the stock will not be fat,) will rather improve it, than injure it, by returning their dung to the land. By rigid grazing I did not mean grazing to excess, or a naked pasture, but a good bite of clover or any other grass, and tolerably fat stock to return something to the land as well as to bite it off. Under the four-field system I have practised, we have grazed very little, and the clover, weeds and every thing has been turned in the land, until it is now full of vegetable matter, and it is a perfect bed for insects; and the winter, in so perfect and warm a bed, has no effect to kill them. My land is more filled with vegetable matter than most land in our country, in consequence of having omitted to cultivate corn, or any hoe crop for nine years, while I had in cultivation some reclaimed swamp land, which was alone cultivated in corn as long as the tide could be kept out; and the very pests, blue grass, &c. which R. so much dreads, got the advantage of me for a time, but which I have now conquered by the corn crop, once in four years, and which I think will be kept under by corn once in five years, together with the grazing once in every five years. To Rivanna, with whose communication I was highly delighted, I will say, that I think his system a most excellent one, and had thought of adopting a similar one before I saw his communication; but I have found from experience that clover will not bear much grazing at a year old; and if I give up my standing pasture, I must have a field which will bear a good deal of grazing. I think it is evident that Rivanna also thinks clover will not bear hard grazing the first year, from his recommending that his two clover fields should be moderately grazed, and not grazed until 20th June, and should be assisted with a standing pasture also, which, in fact, is a six-field system, and one which I should not hesitate to adopt, if I had another field to make a standing pasture of, and did not think that rigid grazing was absolutely necessary to get rid of the multitude of insects with which my land is now filled. The chinch-bug, as yet, is not the insect with which I have most suffered, and the Hessian fly rarely does us much injury, (when the wheat is sown in good time, and on clover fallow,) but I have suffered most from wire-worm, cut-worm, corn-flea, and all the tribe of insects produced by non-grazing and clover-lays. Perhaps I miscalled the worm which injured my wheat so much last fall, when I called it a clover worm. It was the wire, or bud worm, which injures the corn in the spring so much on clover lands, and that was the reason I called it a clover worm. I think the clover, and non-grazing, has produced, or increased the number and variety of grubs very much, at least on my land; for I have remarked in the forest, or ridge-lands in our lower country, where they have little or no clover, and graze, they never suffer with grubs of any sort, and find no difficulty in getting their corn to stand. They suffer with Hessian fly, but never with the great variety of insects we have on the river in our wheat. Chinch-bug is a new thing with us, (having had it only two years,) and I did not allude particularly to it, when I spoke of changing my system on account of the increase of insects.

I think the objection to three grain crops in succession in a system of agriculture, is generally exaggerated, if the land is good, or if you have the advantage of lime, or marl. At least, I have found that my land improved under it very rapidly, and I should never have abandoned the four-field system, but for the insects. I think it is of not quite the consequence most persons attribute to it, though of some, that the crops should be distributed farther apart, provided you give sufficient rest to your land in the course of the rotation; and I think it all-important to let the clover wear out a little before you use the field as a pasture, so that other grasses will put up to bear the hoof, which clover will not do well, and which I think will be effected in the five-shift rotation I propose to adopt. In addition to which the suggestion of my friend C. Braxton, in his most admirable communication on the five-shift rotation, "that the plough should not be again brought into action before the sod is reformed, which will be in two years in land that is in tolerable condition, and this formation of sod is, I think, the test of reformation of soil," is most worthy of notice, for I have frequently remarked that when a standing pasture, or a lot, which had been some time in grass, even if poor land, was broken up, it will produce much better for several years than the most sanguine expectation would lead you to suppose. I cannot think the three grain crops in succession can be so very exhausting, after my own experiment for twenty-odd years, together with that of the two Messrs. Wickham of Hanover, (whose pardon I must beg for introducing their names here,) who have cultivated their estates for some twenty years in the same rotation, and also grazed them much more than I did, (and thereby have kept off insects much more effectually,) and have quadrupled their crops; for I well recollect when the two estates were cultivated in one, the whole never made half as much wheat or corn, as each of them now makes. It is true, that they are excellent farmers, and use marl liberally, which was not formerly done, but if the four-field system with three grain crops in succession was an exhausting one, even with marl, they could not have produced the very great improve-

ment I have spoken of above with all their good management.

I sat down, only to make a few remarks in reply to those most excellent communications of Rivanna, R., and my friend C. Braxton, and I find I have made a long, and I am afraid tedious communication. If you think proper, you will please publish it in your most useful Register.

Most sincerely yours,

HILL CARTER.

Shirley, March 8th, 1840.

AN IDEA OF THE UNIVERSE.

From the N. Y. Journal of Commerce.

In the Christain Keepsake for the current season, among a very creditable variety of articles furnished for that beautiful annual by British writers, is a splendid essay by the distinguished Dr. Thomas Dick, so well known in this country, by his works on various subjects kindred to that indicated by the heading above. The length of this essay makes it impossible to cite much of it in our columns, and as the volume itself will reach comparatively few of our readers, we have concluded to give them the doctor's leadings notions in our own words.

He begins with what the senses of man command around him in the way of a *landscape*, and comparing this little space with what is immediately around us on all sides, observes that it would be requisite—taking the general average of a pretty extensive landscape—that more than nine hundred thousand landscapes of the extent we generally behold, should pass before our view, ere we could form an adequate conception of the bulk of the whole earth. The surface of the globe, he says, contains no less than 197 millions of square miles. No human mind can form a conception of this.

The earth, however, is but an inconsiderable ball when compared with other planets of our system. One of these bodies could contain within its dimensions nine hundred globes as large as the earth; another fourteen hundred; and were five hundred globes as large as that on which we dwell, laid upon a vast plane, the outermost ring of the planet Saturn, which is six hundred and forty-three thousand miles in circumference, would enclose them all. And yet these bodies seem only small bright specks on the concave of our sky.

Again—earth, planets, comets, and all—the whole subordinate solar system—how small it is, compared with its central luminary. No intellect can reach to the slightest conception of such a body. The sun is five hundred times larger than the whole, and would contain within its circumference thirteen hundred thousand globes as large as our world. To contemplate all the variety of scenery on the surface of this luminary would require more than fifty thousand years, although a landscape five thousand miles in extent were to pass before our eyes every hour. What a scope were this for the explorations of intellect and imagination throughout eternity!

But this system, with its sun, is but a point in the firmament. Before we could arrive at the nearest object in this firmament, we should have to pass over a space at least twenty *billions* of miles in extent—a space which a cannon ball flying with its utmost velocity, would not pass over in less than four millions of years. What hosts of orbs are visible here of a winter's night! How vast must they be! There is every reason to believe, that the least twinkling star which our eyes can discern, is not less than our sun in magnitude and glory, and that many of them are even a hundred or a thousand times superior in magnitude to that stupendous luminary. And as the Creator does nothing in vain, as he must be supposed always to act in the plenitude of his perfections, those thousands stars, which the unassisted eye can perceive in the canopy of heaven may be considered as connected with at least fifty thousand worlds, compared with the amount of whose population, all the inhabitants of our globe would appear only as "the small dust in the balance." Here the imagination might expatiate for ages of ages, in surveying this position of the Creator's kingdom, and be lost in contemplation and wonder at the vast extent, the magnitude, and the immense variety of scenes, objects, and movements, which would meet the view in every direction. For here we have presented to our view, not only single suns and single systems, such as that to which we belong, but *suns revolving around suns* and systems around systems—systems not only double, but triple, quadruple, quintuple, and all in complicated but harmonious motions—*motion*—more rapid than the swiftest planets in in our system, though some of them move a hundred thousand miles in an hour—periods of revolutions which vary from thirty to sixteen hundred years—suns with a *blue or green* lustre revolving around suns of a white or a ruddy color, and both of them illuminating *with contrasted colored light* the same assemblages of worlds. And if the various orders of intelligences were unveiled to our view, what a scene of interest, grandeur, variety, diversity of intellect, and of wonder and astonishment, would be open to our view!

And still we should be on the verge of creation! The visible is as nothing compared to the invisible. The milky-way is found to consist of clusters of stars; and the late Sir W. Herschel in passing his telescope along a space of this zone, fifteen degrees long and two broad, descried at least fifty thousand stars large enough to be distinctly counted; besides which he suspected twice as many more, which could be seen only now and then by faint glimpses, for want of sufficient light; that is, fifteen times more than the acutest eye can discern in the whole heavens, during the clearest night; and the space which they occupy is only the 1-1375th part of the visible canopy of the sky. On another occasion, this astronomer perceived nearly six hundred stars in *one* field of view of his telescope, so that in the space of a quarter of an hour, one hundred and sixteen thousand stars passed in review before him. Now, were we to suppose every part of this zone equally filled with stars as the spaces now alluded to, there would be found in the milky-way alone, no less than 20,190,000, that is, twenty millions, one hundred and ninety thousand stars, or twenty thousand times the number of those that are visible to the naked eye. In regard to the *distance* of some of these stars, it has been ascertained that some of the more remote are not less than five hundred times the distance of the nearest fixed star, that is, at least 9,940,000,

000,000,000, or nearly ten thousand billions of miles; a distance so great, that *light*, which flies at the rate of twelve millions of miles every minute, would require one thousand six hundred and forty years, before it could traverse this mighty interval!

Such is the explanation of that "apparently irregular belt which appears only like *an accidental tinge on the face of the firmament.*" Millions of magnificent suns, where not a sparkle can be distinguished by human eyes!

And now, the doctor asks, what shall we say if this vast assemblage of starry systems be found to be no more than a single *nebula*, of which several thousand, perhaps even richer in stars, have already been discovered? and that it bears no more proportion to the whole sideral heavens than a small dusky speck which our telescopes enable us to descry! Such is the present theory, and it is founded on most elaborate observations by the first astronomers of modern times.

And here a calculation is entertained as to the extent of what may in one sense be called the *visible* universe. There have been more than 3000 of these nebulæ already discovered. Supposing the number of stars which compose the Milky Way to be only ten millions, (half the number formerly stated,) and each of the nebulæ, at an average, contains the same number; supposing farther, that only two thousand of the three thousand nebulæ, are resolvable into stars, and that the other thousand are masses of a shining fluid not yet condensed by the fiat of the Almighty into luminous globes—the number of stars or *suns* comprehended in that portion of the firmament which is within the reach of our telescopes would be 20,000,000,000, or twenty thousand millions, which is twenty millions of times the number of all the stars which are visible to the naked eye!

Still our philosopher suggests even these assemblages of systems may be but as a single nebula to the whole visible firmament, or even as a grain of sand to the whole earth, compared with the invisible universe beyond!

Speaking of what was called the planetary *nebulæ*, which are round, compact bodies, like planetary disks, when viewed through telescopes, Herschel mentions one in the constellation of Andromeda, "that would more than fill the whole orbit of Uranus," which is three thousand six hundred millions of miles in diameter. Such a body would, therefore, contain 24,429,081,600,000,000,000,000,000,000, or more than twenty-four quartillions of solid miles, which is sixty-eight thousand four hundred millions of times larger than the cubical contents of the Sun! Hundreds, of these *nebulæ* have never been resolved into stars. Some are thought to be luminous matter in process of condensing. One of these, in the Sword of Orion, is computed to be 2,200,000,000,000,000,000 times larger than our Sun. All these bodies may be supposed to be advancing to the formation of new systems for replenishing the void of space, and displaying the Creator's glory.

The *motions* of this universe are the subject of a concluding hint. Nothing in nature is quiescent. Every thing goes in its stated orbit. And the rate of these motions, in every known instance is not less than several thousands of miles every hour, and, in some instances, thousands of miles every minute. The fixed stars, though to a common observer they appear nearly in the same position with regard to each other, are found, in some instances, to have motions far more rapid than those of any of the planetary globes, though their magnitude is immensely superior. The stars sixty-one Cygni, whose apparent motion is five seconds annually—and consequently altogether imperceptible to a common observer—yet at the distance at which this star is known to be placed this motion is equivalent to one hundred and twenty billions of miles every year; or three hundred and twenty-thousand millions every day.

Such, modestly remarks the doctor, are a few rude ideas respecting the universe. All these objects, however, do not constitute the universe. They are detached parts of it, and may be as nothing to the whole. Of this whole, man probably may never be able to form a conception.—The highest created intellect may not. To God only does it seem likely to be known.

SEPARATE AGRICULTURAL PUBLICATIONS AT THE FARMERS' REGISTER OFFICE.

We frequently receive from subscribers requests to send single copies of the 'Essay on Calcareous Manures,' and accompanied with the expression of regret at not being able to send payment of so small an amount as 50 cents. We have never failed to send the work, when requested by any one for his own reading, whether ordered with or without payment, (and these small dues from remote debtors are very rarely paid in any after time,) for the publication was made that the work might be *read* as extensively as possible, and not with any expectation of making a profit by the amount of sales. But it is very easy for any person who desires to obtain that or any other separate publication of this office, to avoid the obligation of receiving it as a present. If no small bill will suit the order at retail price, a $5 note will pay for 10 copies—and the risk of mail conveyance, both of the money and the publications, in all cases is borne by the publisher. Ten persons may be thus supplied with the work above-mentioned, at 50 cents for each.

It would illy become the author to utter any thing in commendation of the 'Essay' as a literary production, or as to the degree of success with which the doctrines and the practical deductions therefrom have been set forth. But he may venture, after this lapse of time, and of universal acquiescence and of approval by all other persons who have examined or acted upon them, to claim that the doctrines and precepts *are true;* and if so, their being known is all-important to every farmer, and especially in every district of neglected calcareous manures. In all of the latter circumstances (which are still general through ex-

tensive regions in the southern Atlantic states,) we may venture to assert, that the profit, both individual and general, of every new case of the application of the doctrines and precepts referred to, will exceed more than a thousand-fold the cost of the volume containing them.

In the cheap form of the second edition (of which a very large number of copies were printed, and not many now remain on hand,) the facility of extensive circulation was the main object in view; and for that object, there was sacrificed much of the pride, and all the (possible) profit of authorship. Several thousands of copies have been distributed, and a large proportion gratuitously; and we would be pleased to dispose of all that remain on hand, also as gifts, if sure that they were sent where acceptable and valued, and where they would be of most service to the improvement of agriculture. Therefore, to all claimants on *that ground*, we shall not be rigid as to conditions or payment; for even with a smaller proportion of payments then heretofore received, we shall be content and gratified to send copies of the work to any quarter where they will be serviceable to agricultural and general interests.

ED. F. R.

PREPARATION OF MANURE.

To the Editor of the Farmers' Register.

March 7th, 1840.

I am sorry to complain of a typographical error in my communication of January, which occurs in the second line; *i. e.* "manifested" for maintained, or sustained, (I am not sure which, as I never keep rough copies,) but I think the latter.

I cannot blame your compositor, being too sensible of the illegibility of my hand; but do assure you, that an unwillingness to give trouble, causes me great pains in writing, (unavailing as they seem,) and often deters me from communicating with the Register. In this instance, I am only surprised at the accuracy of the piece—no other mistake occurring than the trifling one of omitting the letter *n* in an indefinite article, before a vowel. But notwithstanding my chariness of giving trouble, I am led by the occasion to give you my management of an operation in which we are now engaged, having never seen a communication on it. I mean as relates to manure. It may be worth something, at least to tyroes.

During the season of feeding and littering farm-pen stock, having accumulated in the early part of winter a considerable body of corn-stalks, I use alternately with them, straw in piles, instead of racks, which mixture promotes decomposition, and retains, better, the liquor of manure. Leaves are in the same method occasionally introduced. Manure from the floored pens of fattening hogs, littered in the same way, is advantageously hauled and scattered over the farm-pens. This being the richest made on a farm, can be better distributed on land by being thus mixed with the weaker manures; and with the same view I introduce, at different times, the manure from stables.

I make it an invariable rule to turn over, with two or three-pronged dung-hoes, the whole mass of manure twice or three times during the season of making it; the advantages of which are twofold; first, the thorough admixture of the different qualities, and secondly, the encouragement given to decomposition by partial admission of air; with which motive I frequently let in the stock-hogs.

Lastly, when about to commence hauling out, the contents of the farm-pens are put into ricks with dung-hoes and pitch-forks; roads being left between for carts and wagons to drive in at one end and out at the other. The object of which is to facilitate loading, both as to convenience and lightening the manure, which loses very little strength by the operation, if ploughed under as it should be, as fast as hauled on the land. Indeed, the sudden drying of manure in this month prevents much escape of its essence by evaporation. Fire-fang is apt to occur if these large ricks remain more than one week. RIVANNA.

It has been always a cause of regret that our friend who signs as "Rivanna," should favor the readers of the Register with so few of his always excellent and valued communications; and it will add much to the regret if *our* fault should make him still less communicative than heretofore. We know by report that "Rivanna" is one of the best farmers of Virginia, and there is no one whose *anonymous* communications are more desired than his. His real signature, as in all cases, would add greatly to their value. We trust, that neither "Rivanna" nor any other correspondent will again have just cause to complain of our proof-reading; and we may venture to assure him that he will not be at all justified by that excuse in keeping his pen idle.—ED. F. R.

EXTRACTS OF PRIVATE CORRESPONDENCE.

——*East Tennessee, March 10th*, 1840.

"Your favor of the 5th February has been received; also the last volume of the Register. Pray accept my thanks for your kind remembrance. My zeal in the silk culture is unabated. Rather higher than in my first love, notwithstanding I have some million and a half of buds which I could not sell. They are surpassingly fine, and all boxed up in tan, for the market, which did *not* offer. Be it so. Perhaps 'tis all the better for the culture of silk. I shall plant immediately (the ground is ploughed) twenty-five acres, (my very best wheat field.) Don Quixote, you know, gave his best grain land for books of knight errantry. My cocoonery 200 feet by 60 is going up. Four millions of eggs are in the ice-house; half of which I wish to keep back, if I can, for a second crop. My plan is, to feed so large a number of worms as will justify my employing reelers the whole year; and thus secure their permanent services. China, in my opinion, cannot surpass East Ten-

nessee in adaptation for the silk culture. The multicaulis grows as well with us as corn; and the silk-worm is so healthy that I do not think we lose 2 per cent. Every consideration appears to show that nature points to this as the silk region of the United States *par excellence*. We have no conflicting staple. We have a very dense poor white population—saying, "give us employment" —ingenious, not *ashamed* to work, and remarkably docile—more manageable than the northern population of like grade. The girls and men in my cotton factory are better hands, and more manageable, than at any factory in Maryland, and equal to those in Massachusetts. And *any number* whatever can be obtained for extremely low wages. Provisions, abundant and cheap. Again--the merchants (and that class is very numerous and influential in E. T.) have a deep interest in this business. For our currency is always at a great discount, and we are so far from market, that our heavy agricultural productions cannot sustain the transportation. Silk will be better for us than mines of gold and gems; and more than supply our want, long to be experienced, of rail roads, canals, and navigable rivers. If I could, I would make every man in this region dream of silk until the vision became reality. If I fully succeed this year the business is established. A good many are entering into it, and the present season will be the crisis of the *disorder*." * * * *

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* * * "Every publication which can be relied on respecting the silk culture will be valuable to the country; for although I do not believe that it is a culture which will ever admit of profit on a large investment, yet I am satisfied, that if establishments were formed in each neighborhood for the purpose of buying cocoons and reeling the silk, the tending the worms would be found to engage advantageously the women and children every where, who are now mere consumers. In the part of the country in which I reside, Habersham county, in Georgia, many persons were engaged in a small way, in tending and feeding the worms on the native mulberry of the country, and the result was a conviction that no climate could be more favorable. The winters are steadily cold from November to March both inclusive, the thermometer varying during that time, in a northern shaded exposure, between twelve and forty; sometimes at midday going as high as fifty, and perhaps once during a winter going to zero. So that the climate is cold enough to preserve the eggs from hatching until late. Our summer heat very rarely goes above 87°, and it has been found by our experience, that no trouble need be taken to keep the atmosphere in an ordinary room in a sufficiently equable state. No trouble indeed is necessary except to keep the worms clean and well fed. The atmosphere is so dry, that there is but little snow, and I have never seen moisture even on the plaster walls of stone, where the plaster was put on the wall without the intervention of "furring." You will I think then admit that in my section of the country, at least the women and children may raise the cocoons successfully in a domestic way." * * * * *

Sparta, Ga., March 4th, 1840.

"To show you how forward the season is here, I enclose you a few leaves of the morus multicaulis, taken from plants that came from cuttings planted on 15th February, 1839. Any quantity of worms can be fed here at this time, as the leaves will increase in quantity, and faster than the worms would increase in the consumption of them.

My object in sending you this information is to show you, and others, that silk can be raised in Georgia, and more than one crop in a year. My silk-worms' eggs commenced hatching on the 2d inst., and will soon all be out.

The peach blossoms made their first appearance on the 17th February, and are now falling; they were fullest on the 25th.

The largest of the leaves enclosed are 3 by 4 inches." * * * * * * *

——*5th February*, 1840.

* * * "Permit me to express to you the gratification I experienced in the evident superiority of the concluding numbers of the last volume. (Not having been at home for the last four months I have not of course seen the numbers of the present volume, for which I am now sending my subscription.) I was particularly pleased, and hope instructed, by your essays on improving lands by the ploughing in of green crops, and hope that you will keep a watchful look-out for any thing which may throw farther light on that subject.

A few years ago there was much written on the subject of the Italian rye grass, as a vastly productive and very easily cultivated grass. The lamented J. Buel thought most highly of it as a productive and quick growing grass, and said that he was satisfied it would answer very well south of Pennsylvania. As it came from so warm a climate as Italy, I thought we might reasonably calculate that it would bear our hot dry summers much better than most of the foreign grasses. Induced by his representations, a friend of mine united with me in sending for some of the seed, which came up beautifully, but proved to be nothing but the English perennial rye-grass, a small dwarfish plant, exceedingly impatient of heat and drought, and of very little value. If you can give us any information on the subject of this Italian rye-grass, I have no doubt it will be acceptable to my brother farmers as well as myself. If only half of what is said of it is true, it must be far more productive than any we are acquainted with, and then its culture is so easy, requiring only 15 or 20 lbs. of seed to the acre, and lasting for many years. A few years ago there was a great deal written in your paper about the Gama-grass, and no doubt some of your readers gave it a fair experiment. I should be very glad to learn whether it was really valuable, or a mere humbug; and should be obliged for the same information in reference to the Guinea grass, and more especially if the latter can be made use of as a grazing grass in this country. I have a few of the plants, but they are in a garden, where of course there is little opportunity of testing their value. They stand our winters well, and produce a great quantity of vegetable matter, which horses, constantly stabled, eat with great avidity. But it certainly does not grow with any thing like the luxuriance with which it is said to do in Jamaica, and does not seem to recover quickly from the bite of animals.

I hope you will excuse this liberty, as I have been a subscriber to your valuable paper from its

commencement, and this is the first time I have troubled you with the reading of a letter. Wishing you all success in your truly useful effort to raise the character of our agricultural interests, I must now bid you farewell, with the assurance that I remain, &c."

We are unable to give any information as to the Italian rye grass; or as to the Guinea grass, except that we have not heard contradicted the high character which was given to it by several of our correspondents in some of the early parts of the Farmers' Register. The Gama grass seems to have been lost sight of latterly; and we have never known any person to turn its growth to profit. We will thank any one better informed to answer any of these inquiries.

If our respected correspondent owed us any apology in regard to his letter, it was not for writing it, but because of *not* having written before, and for publication.—Ed. F. R.

A SIMPLE AND CHEAP SILK REEL.

To the Editor of the Farmers' Register.

Brunswick, March 19, 1840.

You will please accept of the reel I have ordered you; it is such as I use in reeling silk. I have never been able to see any advantage the Piedmontese, or any other kind, has over it. The model I purchased in Hartford, Connecticut, for $5, and it is there called Dale's reel. I made it more simple by dispensing with two whirls which served to give it additional motion, which was not necessary. I claim no credit for any improvement, and my neighbor, Hartwell Hill, and a faithful mechanic, is the maker of the one sent to you. You can readily see it is simple and cheap. My only object is to let the public know that silk reels can be made for a mere trifle, which I believe to be equal to any now in use, and no patent right on them.

If you think the public can be benefited in any way by inserting the above in the Register, you can do so. I expect to draw upon me the censure of some who hold patents of other reels; but I don't fear a comparison of this reel with any I have seen; not meaning in appearance, but as to performance. Any common carpenter can make the reel, and there being no patent right on them to puff them off, has kept them in the back ground. You can see from the numbers how to put the parts together. The band must be put on so as not to rub on any thing but the two whirls.

Thomas Hicks.

The above letter was received just in time to be included in the last sheet of this number, and two late for us to see the reel put together. We value the present the more as coming from one of the earliest, and now one of the most experienced of all the new silk-culturists of Virginia, and who has had enough practice to succeed well in reeling silk, as well as in feeding worms, even with such humble machinery, and with mechanics and reelers totally ignorant when first employed. The opinions of Mr. Hicks, being derived from practice, are especially entitled to respect, and his communications for this journal will always be very acceptable.

We shall best second the liberal and public-spirited intentions of Mr. Hicks, by having the reel, which he has sent to us, put together and kept for some months for examination in this town. It is proper to state that it agrees with the Piedmontese reel in one respect (as all reels ought) that of making the hanks of the same, or standard size.—Ed. F. R.

FURTHER REMARKS ON THE ERRORS OF THE TRANSLATORS OF DANDOLO.

Our advertisement on the cover of the January No., inquiring for a copy of the original work of Count Dandolo, (*'Dell' Arte di governare i Bachi da Seta,'*) has served to obtain it; an end which all of our sundry previous attempts, made both in this country and in Europe, had failed to reach. The copy obtained is of the fourth Milan edition, which is later than any we had seen referred to, or heard of, before. For the gift of this long sought and much valued volume, we are indebted to the kindness of Robert Chisholm, esq., of South Carolina. Before obtaining this, we had received the Florentine abridgment of Dandolo's first edition, which was acknowledged on a previous page; and we had also been offered by Peter Hulme and John Vaughan, esqs., of Philadelphia, a copy of one of the early and therefore less perfect editions, the loan of which is now rendered unnecessary. To all of these gentlemen, we feel as much obliged for the kindness of their intentions and their offers, as if they had been fully availed of.

A very slight examination of this volume, and comparing it with the English translation, (which, however, is of an earlier and less full edition,) served to confirm our previous opinion, that all our known translations, and the American treatises drawn from them, are grossly incorrect in the statistics and arithmetical statements—and that such errors are even more generally pervading than we had before suspected. As to the particular error which we had ventured to expose in the last number, (at p. 102,) even before seeing the original work, it appears that we have not presumed too much. The spaces are expressly stated by Dandolo in *square braccia*, which his French translator foolishly changed to *feet*, (according to the *supposed* equality of lineal measures,) and thereby reduced the true spaces nearly one-half. We only erred slightly in one respect, (by paying too much respect to Murray's authority,) which was in

making the Milanese *braccio* too small, and by so doing, we somewhat abated in appearance the real enormity of the errors made by the translators and their copyists. The Milanese braccio, instead of being about 22 English or American inches, is, in truth, 23.4257, or nearly twenty-three and a half inches. This further correction being made, serves still more to increase the variation of the translators from the author's words as well as meaning.

But though this one radical and all-pervading mistake is the greatest and the most ludicrously absurd of all, there are almost as many other mistranslations and incorrect amounts, as there are quantities named in the work. The reader may form some idea of the detriment thereby caused to a treatise of which the great value consisted in careful and accurate experiments and practical operations, of which all the quantities have been changed, and most of them greatly changed, in all the many existing versions. If all the sums and numbers of a treasury report (for example) were increased or decreased from 10 to 75 per cent. by typographical errors, or if a work on practical mensuration had every arithmetical problem worked wrong, and showing wrong results, their value would thereby be scarcely more injuriously affected, than is Dandolo's admirable work by the mistakes of his translators. A worse name than "mistake," however, is deserved especially by the compiler of the Congress 'Manual,' in as much as he stated that, "having the use of the original work in Italian, as well as the French translation from which the English version was made, the errors of the latter were corrected—" an engagement which his performance utterly falsified in every one of the numerous particulars; and it would seem that either his ignorance, or his gross inattention, prevented his even suspecting the wide variance between the original which he pretended to consult, and the translation from which he really copied his work—which, like most other government jobs, was probably as well paid for, as it was imperfectly and fraudulently executed.

The error above named in the braccio's lineal measure affects all of the many dimensions stated of the laboratories, and their shelves, passages, and all other parts. The weights are still more erroneously rendered. The quantities of leaves directed to be given in every day throughout the feeding time, are changed by the translator from Milanese to English pounds, by a very simple rule. The changes are made by merely adding 50 per cent. to the Milanese weights. But unluckily the simplicity of the rule is its sole recommendation, as it is altogether incorrect. The Milanese great pound *(peso grosso,)* of 28 ounces, is equal to 11768.425 English grains, and the English pound avoirdupois is 7000 grains. Therefore the Milanese pound is equal to 26.90 ounces avoirdupois, instead of 24 ounces, as is the ratio of increase made throughout the English translation.

If mistakes and errors are indeed to be found to but half the extent here alleged, is it not manifest that a new and correct translation of Dandolo is greatly required? Or rather, does it not prove that, as to its most important facts, Dandolo's has been almost a "sealed book" to all others than his countrymen? It is indeed a most striking proof of the value of this great work, that, notwithstanding the numerous arithmetical errors of all the versions, Dandolo's authority (falsely as it is cited,) should yet continue to be held in the highest estimation!

It was easy enough to ascertain, as we had done, in part, before even seeing the original, that the numbers and quantities of the translations are wrong; but it was far more difficult to determine what would be right, and possibly we may not have avoided falling into some new mistakes, in escaping from the old ones. But we shall offer the grounds of our alterations; and if any, or all are wrong, the means will thus be furnished to the better informed to correct all such errors. If the translators had in like manner submitted their authorities, their statements would not have been deceptions, and might have been useful, even if proved to be erroneous. We invite, as well as offer the means for, the correction of our mistakes, if any are here made.

A concise statement will be offered of the errors of quantity in the translations, not so much however of individual cases, as of whole classes.

First, and the most erroneous, the substitution of the *square braccio* of Dandolo by the *supposed* equivalents in *square feet*, has already been sufficiently exposed, in the last number.

Next, as to the length of the braccio; in regard to which the difficulty of correction is not the deficiency, but the superabundance of authorities, and their want of agreement. The common weights and measures of Italy, of the same denominations, are different in every two towns; and even of the same city, different authors of reputation report different values of the same denominations of common weights and measures. The uncertainty thence arising is so great, that it is a matter of great difficulty for a foreigner to understand the value of any particular denomination. Nor would it have been discreditable to the French or the English translator of Dandolo, if he, by following some one author (and referring to the authority so preferred,) had been led into

error. But many and various as are the authorities to serve as guides, it does not appear, to our understanding, that the English translator of Dandolo has truly followed any one of them; or if he has followed one, no intimation is given of which, nor of the grounds of preference.

It would be foreign to our direct purpose, though serving to show more fully the general confusion and difficulty of the subject, to state the various values of the braccio and of the pound in different towns of Italy. The braccio of Milan alone, (the measure of course referred to by Dandolo,) is valued as follows, by different high authorities:

According to Cavallo, in a table in Rees' Cyclopædia, (art. "Measures,") and also in Edinburgh Encyclopædia, the Milanese braccio is equal to 1.725 English feet, or 20.700 inches.

According to Murray (in Brewster's Journal of Science, and Edin. Ency.) it is "about 22 inches."

According to the table in Dandolo's 4th edition (page 311,) it is equal to 5.95 *decimetres*, making 23.4257 inches.

There are two Milanese *pounds* used in commerce. The heavy pound *(peso grosso)* is of 28 ounces, (of which the value will be presently also stated,) and the light pound, *(peso sottile,)* of 12 *oz.* according to Dandolo, but of 8 *oz.* according to Rees' Cyclopœdia. By the table of comparative weights given in the original of Dandolo's work, as well as other parts, (and as also stated in the Florentine abridgment,) it is manifest that the heavy pound is referred to in all the instructions, and statements of quantities. But this could not be known from the English or any known translation. For raw silk is one of the commodities, (and a very large and important one in Lombardy,) which is always weighed and sold by the light pound; and therefore a reader who was informed as to that fact, might have very reasonably (though incorrectly) inferred, that the weights of the kindred articles of cocoons, silk-worms, their eggs, and perhaps all other weights named in connexion, in the same treatise and by the same writer, were also reckoned by the same weight, the light pound. This difficulty would be still more increased by the following attempt at explanation in Rees' Cyclopœdia. "At Genoa, Florence, Leghorn and *Milan*, the pound for weighing gold and silver is divided into 8 *oz.*, and the ounce into 24 *danari*, or 576 grains. The commercial weight in most of the above places is the same for light goods as for gold and silver, and is called *peso sottile;* but a heavier weight is used for coarse commodities, and is called *peso grosso.*"

Having decided, however, that the pound referred to by Dandolo is the "*libbra grossa Milanese*" of 28 ounces, let us see the authorities for its value.

According to the tables in Rees' Cyclopædia, 1 Milanese pound, *peso grosso*, is equal to 11592 English grains.

According to table of Dandolo, the same, or 1 "*libbra grossa Milanese*" is 0.7625 *kilogrammes*, [or 11768.425 English grains.]

The Milanese ounce is 2.7232 *decagrammes*, [or 420.2986 English grains.]

Of the several and variant values of the common lineal measure and common weights of Milan, we receive as correct those which are according to the table in the 4th edition of Dandolo's work, as quoted above. This table stands as a part of the regular work, and may be inferred to be from Dandolo's pen as much as any other page. But should it be even an addition from another hand, yet being published in Milan, and designed particularly for this work, and the values being all exactly stated in the new French and new Italian equivalents, it would be very strange indeed if a table thus prepared, for such a purpose, should not be correct.* Yet this table gives different, and in some cases very different values from any other authority. By adopting these corrections, and applying them to every quantity stated by Dandolo, it will be seen that his allowances both of food and space for silk-worms were considerably greater than as stated in any known version of his instructions.

It is unnecessary to extend these strictures and corrections farther than these three great classes of errors, each and every particular quantity named of each being incorrectly rendered by the translator and his followers. Neither have we extended our examination to every particular quantity of other kinds named. But if a cursory and partial glance and comparision may serve as grounds for an opinion, we may venture to affirm that in all other quantities stated, whether of land, or of money, or in the smaller measures of lines, inches, or ounces, there is as much departure from the author's meaning as in the more general errors specified. In short, if there is even a single quantity correctly stated, among all designed to be given by the translators, we have not observed such an exception to their general, if not universal rule of translation.

A few particular cases only of gross errors will be stated which do not come under the above general classes.

* As this table purposes to give the values of Milanese weights and measures in those of the "new Italian and French weights and measures," it may be inferred that the admirable metrical system of France was established also in the kingdom of Italy, when the latter was under French rule. If so, it makes the authority of this table indisputable.

The Milanese square land measure *pertica*, (perch,) is the one used by Dandolo, and in various passages of his estimates. This measure (according to the table of Dandolo) is of a *hectare* 0.065452; or is equal to 782.6635 English square yards, or between one-sixth and one-fifth of an English acre. The value of this measure is given in the English translation in three very different quantities, and all of them wrong. At page 287 of the translation, the *pertica* of the original is made "acre"; at page 358, the same quantity and denomination is given as only ten square feet, and in several other places, the *pertica* is simply rendered as "perch" in English, which is equal to 30¼ square yards.

At page 352 of the translation "the 2928 square feet" named, according to the original should have been "2928 square braccia," or nearly four times the extent in square measure.

The Milanese coin *lira* of the original (the money value always used) is in most cases stated as "*franc*" by the translator, though other money values are stated by the *lira*, as in the original. Yet so far from these values being equal, the *lira* is very little more than three-fourths of the *franc*.

Such are the elements of the long and elaborate (and *originally valuable*) estimates of cost and product of silk-culture, as presented by the translators of Dandolo!—Ed. F. R.

CORRECTION OF ERRATA.

In the communication of John A. Selden, esq. in the January number, the following typographical errors, all in page 3, need correction.

Column 1, line 2 from bottom, for "*lime* my corn crop," read "*house* my corn crop."

Column 2, line 27 from top, for "insufficient," read "inefficient."

Column 2, line 13 from bottom, the words "this corn" should be transposed, so that the passage shall be read, "I lost corn this season," &c.

Column 2, line 10 from bottom, for "*successful* spring cultivations" read "*successive*," &c.

Column 2, line 9 from bottom, the words "and is" should be omitted.

IMPROVEMENT OF COTTON LANDS BY FLOWING WITH BRACKISH WATER.

Charleston, 19th February, 1840.

From the Southern Cabinet.

Dear Sir,—In compliance with your request, I have taken some pains to possess myself of the facts connected with the experiment of flowing cotton lands with salt or brackish water. They are as follows:—

In 1838, some marsh land, which had been nearly worn out by repeated crops of cotton, was planted in oats. In the autumn of that year, the stubble was listed in, together with a considerable growth of weeds, which had succeeded the oats. The list was ploughed over, and kept for a fortnight nearly covered with brackish water. The land was bedded as usual and produced a very fine crop.

I am disposed to attribute the success of the experiment mainly to the flowing, because, though the whole treatment was such as to warrant an expectation of improved production, it was scarcely sufficient to account for a growth equal to that on perfectly new land, which was the case in the present instance. Salt has been used with success for manuring cotton, and I see no reason why a moderate flow of salt water should not have the same effect. Yours, with respect,

A Correspondent.

TO THAW FROZEN PUMPS.

To the Editor of the Farmers' Register.

Jackson, Ten., Feb. 29th, 1840.

I noticed, in the January number of the Register, that a person, who signs himself "Mountaineer," inquires "how the freezing of pumps can be obviated?" If he will put into the pump a quantity of salt—if the weather be not as low as zero—it will soon dissolve the ice. Brine will not freeze until the weather is at zero; hence the solution of the ice by the salt when above that point of temperature.

Mechanic.

MILLET.

From the Southern Cultivator.

We have been requested to give what we know and could collect from others on the culture of millet—with which we comply cheerfully. Millet is the most productive crop perhaps that can be put in the ground, and yields grain and hay of excellent quality. In some instances it has been supposed to yield four tons of hay per acre when cut and cured; and stock devour it with greediness—its value consists not only in the blades, but in the stalks, which are frequently four and five feet long, very succulent, and are eaten entirely up by stock. Henry Turney, esq. of Maury, is familiar with its growth and culture—he considers it a valuable article for provender, and thinks it best to sow it about the middle of May; others sow the first of April. This may be left at the option of the cultivator. Tolerable fresh land and strong is best suited to its growth. The ground should be well ploughed and harrowed, the seed sown and then harrowed in, and left in a smooth condition, in order to facilitate the cutting, as millet is a crop that has to be mowed. A peck of seed is sometimes sown to an acre—though a gallon per acre we think is most common. It has been remarked by many, that nearly every kind of fowls delight to feed on the grain of millet, and of course must fatten on it. It would be valuable no doubt, for all kinds of stock, and recommends itself to the attention of farmers.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

Supplies of produce pour into our markets from the interior, in quantities great, and at prices low, almost beyond precedent. Already about 1350,000 bales cotton have been received at the ports of shipment: nearly equal to the entire receipts of last year. Quotations of prices in the large markets at the south and west range from 4 to 9 cents; the largest sales are between 6 and 8 cents. The number of vessels in those ports being inadequate to the demand created by this, and other abundant crops, the rate of freight to Europe on cotton has advanced to 2 to 3 cents per pound.

The supplies of flour, are also very large, and will be greatly increased when the Erie canal shall be re-opened some weeks hence. The price of flour has declined to $4½ to $4¾, and the exportation of it is checked by want of vessels. The duty in England has advanced to 13 shillings sterling per bbl., which, with the present high rate of freight, makes the charges equal to the first cost. Thus the wholesome bread which we could furnish and which would tend to extinguish our debts in England, and enable us to import her manufactures, is denied to her mechanics and workmen, who must eat musty flour for the benefit of her land-owners.

Indian corn sells at 45 to 50 cents per bushel.

The tobacco inspections have been thronged, until lately. Supplies are less abundant just now, owing to the weather and to farming operations. Prices range from $2½ to $6½ per 100, and occasionally higher for a fine or fancy sample—general sales between $3 and $6. Scarcely any of the best quality is yet brought to market.

Low as cotton and provisions are, the manufacturing establishments at the north are said to be doing less work than usual. The scarcity of money, destruction of credit, and derangement of exchanges, have palsied our trade, and all interests feel the blighting effects.

Bank paper, based in some of the states on any thing but sound capital, has become in such cases almost worthless, and the rates of discount as quoted embrace a range from 5 to 95 per cent. The highest rate is in Mississippi, where, with abundant crops, an almost general bankruptcy prevails.

The rates of exchange are improving where the banks are sound, and the difference between New York and the southern states is now reduced to 5 to 7 per cent. Exchange on London is quoted in New York, 8 per cent., in Virginia, 14 per cent. premium. X.

March 24.

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